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Vol. XXVII

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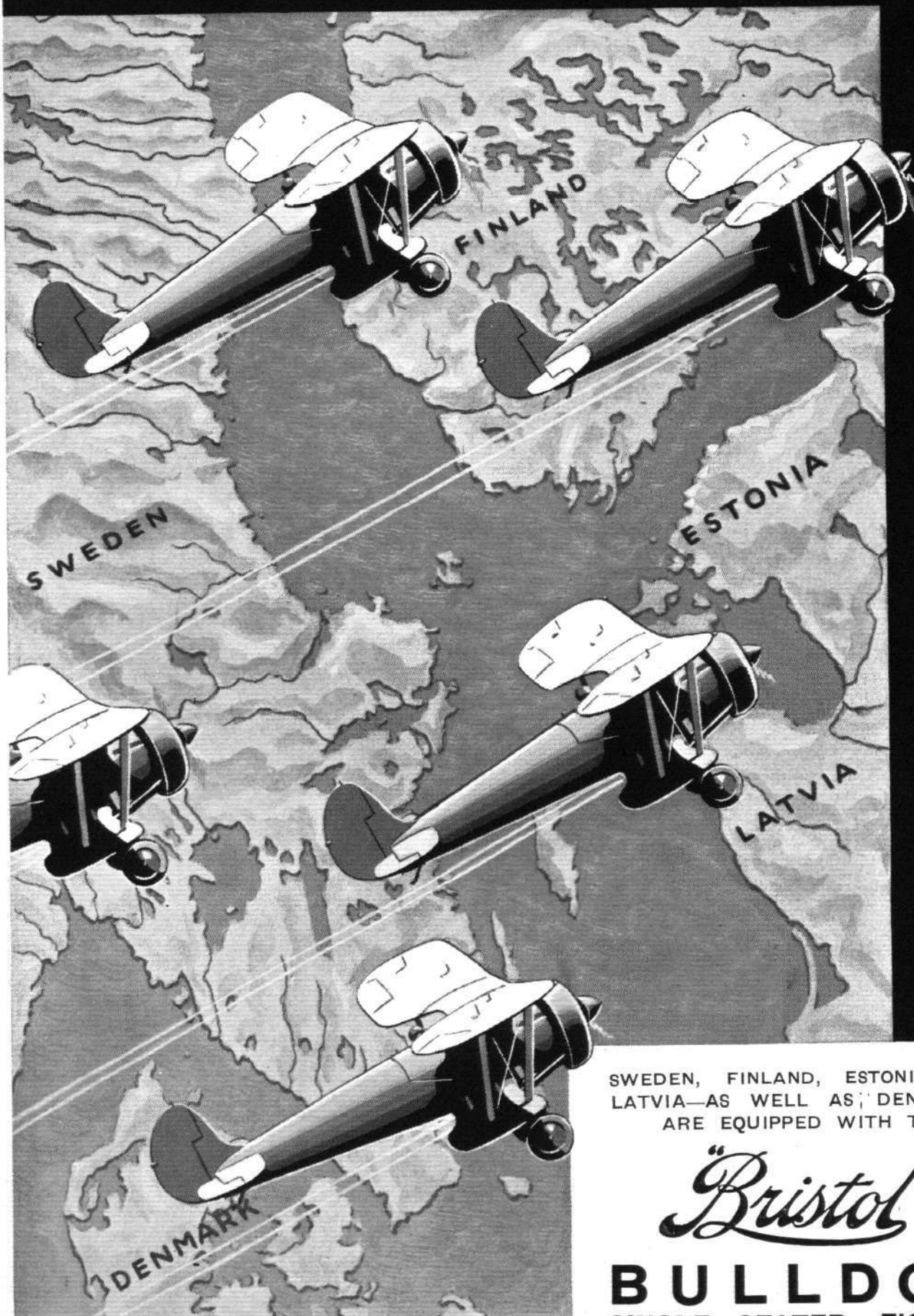


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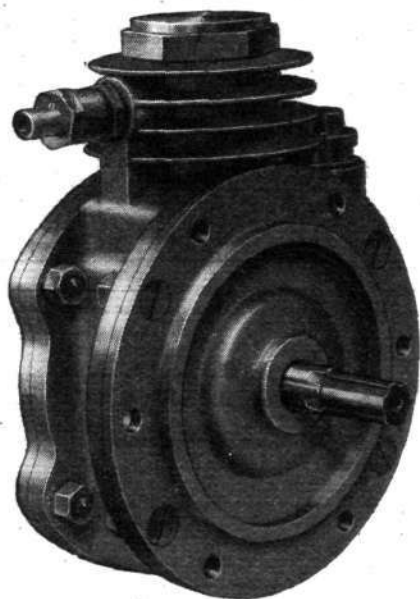
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Expansion

"It does seem to me that we have been carrying out his policy during the last year or two. And where has it led us? It has led us to the realisation that it is a delusion to suppose that unilateral disarmament leads to agreed limitation. We have gone into unilateral disarmament, and no one has followed our example. The result is that we are weaker than we were, and weaker in our ability to persuade other people to agree with us. It seems to me also that if we are in favour of the collective system we should be in a position to do what my noble friend suggested, to put in our just quota to this collective security. If we are to reap the benefit we should be prepared to pay our contribution."

Surely, in this reply to Sir Stafford Cripps in the House of Commons last week during the debate on defence policy, Sir Philip Sassoon summed up in the most concise manner possible the reason for the expansion of the Royal Air Force upon which the Government has at last decided. To speak of unilateral disarmament is, as Captain Guest said, like remaining a free trader in a protectionist world. True, Captain Guest made the remark in connection with civil aviation subsidies, but it may equally well be applied to unilateral disarmament. None can accuse Great Britain of having started an air armaments race. Year after year we have postponed that expansion of our Royal Air Force which successive Governments—including the Labour Government, be it noted—have deemed necessary, in the hope that other nations in Europe would follow our example. None has. The decision of Herr Hitler to establish a German air force, and his announcement that already it has achieved parity with ours—whatever that may imply—and intends to achieve parity with France made the decision which the Government has taken quite in-

evitable. In fact, even without Herr Hitler's announcement, Great Britain would have had to accelerate her air programme, although the urgency has now, perhaps, become a little greater.

As Sir Philip Sassoon said in his speech, even if we are in favour of seeking safety in the collective system we ought to be in a position to put in our just quota. If, as is greatly to be hoped, an Air Pact does come into being, our air strength will be at the back of those associated with us. Therefore, they will certainly not object to us being strong in the air; on the contrary, they will welcome it.

Speeding-up Production

While realising to the full the difficulties, technical and others, of the proposed expansion, we have not the slightest doubt that the existing aircraft industry will be well able to cope with them, particularly in view of what the Under-Secretary of State for Air said in the House about the new conditions in which the issue of specifications and the construction of new machines are to be carried out. There has recently been considerable cause for dissatisfaction with the old system. One needs only to recall that the specification to which the Fairey "Hendon" heavy bomber was designed is of 1927 vintage, and that the Day and Night Fighter competition machines now undergoing tests are to specification F7/30 (i.e., 1930) to realise the delay that could and did take place. That some of the delay may have been due to manufacturers must be admitted. But much of it was to be ascribed to the system. If, as Sir Philip said, manufacturers are to be given not only greater responsibilities but also greater freedom, we have not the slightest doubt that the industry as a whole will prove well equal to the occasion.

It was, perhaps, inevitable that several speakers during the Parliamentary debate should revive the old plea for Government factories. They cannot all be ex-

pected to remember what happened in the early days of flying, when the Royal Aircraft Establishment at Farnborough was the Royal Aircraft Factory, and competed with private enterprise. In the middle of carrying on the war that system proved so thoroughly unsatisfactory that "The Factory" had to be told to cease design—which was thereafter entrusted with success to private firms—and to devote itself to research and experiment. The Farnborough-designed machines were beaten over and over again by those produced privately.

On the personnel side the difficulties are quite as great and possibly greater. It is not merely a question of turning out pilots, although that is no easy task when the standards demanded are as high as those in the Royal Air Force. To maintain the 1,500 first-line aircraft in a thoroughly efficient state so that they are ready at a few hours' notice for any task that may be demanded of them requires an extensive and well-trained ground personnel. The total figure that will be required is in the neighbourhood of 20,000. Fortunately, we start with a nucleus of very high efficiency, and the task, although difficult, need not cause serious anxiety.

An Olive Branch

HERR HITLER'S speech seems to have been framed to allay, so far as words can do it, the general feeling of unrest aroused in Europe by his recent actions. Any such contribution to the cause of peace is welcome. Europe in general and Britain in particular desire nothing more whole-heartedly than Germany's co-operation in averting the war danger.

The passage in the speech dealing with air bombing

is particularly notable. Herr Hitler advocates the international prohibition of those arms which bring death and destruction not so much to the fighting soldiers as in the first instance to the non-combatant women and children. He suggests the prohibition of dropping gas, incendiary and explosive bombs outside the real battle zone. A good deal of definition will be needed before such a principle can be translated into a rule of war, but the principle itself is right. Herr Hitler also talks plain common sense when he says that so long as bombing as such is permitted, any limitation of the number of bombing aeroplanes is questionable.

It is not so easy to agree to the next stage in the plea, namely, that this limitation could be extended into complete international outlawry of all bombing, with the result that the construction of all bombing aeroplanes would soon be abandoned. The bomber aeroplane is in essence a piece of artillery, not a "baby-killer." Its proper function is to extend the range of the gun. As such, it would be futile to attempt to forbid its use in war, and, therefore, it would be equally futile to forbid its construction in time of peace.

The most that can be said for such prohibitions is that during peace no technical progress would be made in the design of such weapons, for drawing-office designs need full-scale tests; and that the personnel would get no practice in the use of such weapons. That may be a strong argument in the case of submarines, but it is very questionable in the case of bomber aeroplanes. The untrained bomb-aimer is likely to do more harm to civilian life than the well-trained airman will do, and that is one of the things which everybody wishes to avoid.



EMPIRE AIR DAY, celebrated last Saturday at ninety-odd aerodromes throughout the country, was an unqualified success that must have surprised even the sponsors, the Air League of the British Empire. This scene, typical of many, was at Hendon, and gives an idea of the intense public interest. The machine in the foreground is a "Moth" of No. 24 (Communications) Squadron. A report of the day's activities appears in this issue.

The Outlook

A Running Commentary on Air Topics

Memorable Day

OFFICIAL figures show that no fewer than 136,000 people visited Service aerodromes on Empire Air Day—last Saturday—and R.A.F. charities benefited to the tune of £5,600. These figures compare with 79,000 people and £3,200 on the occasion of the first Empire Air Day, held last year. At the time of writing no figures are available regarding the attendances at civil aerodromes, but it is thought that the figure is over 10,000, thus making a grand total of 146,000.

These remarkable totals lend interest to the opinion, expressed over the week-end, that Empire Air Day might eventually take the place of the Hendon Display, since, having such a country-wide appeal, it would prove more valuable from all points of view.

Our own view is that there is room for both fixtures. While the suburban and provincial Empire Air Day displays will attract hundreds of thousands, drawn by the possibility of being able to *touch* aeroplanes as well as to watch them, Hendon will hold its place as one of the big outdoor social events of London's summer season.

It is to be feared that more than one good Service aeroplane must have suffered at the hands of sightseers on Saturday, but what the Government lost on the wings, so to speak, will be regained on the roundabouts.

Air-Comdr. Chamier, his co-organisers in the Air League, and all the aerodromes which co-operated, have most certainly shown (in case anybody doubted it) the interest which Mr., Mrs., Miss and Master Everyman now take in matters aeronautical.

A Lighting Difficulty

THE problem of providing adequate emergency lighting for night forced landings is rapidly becoming more acute. Eventually, of course, every air route will have landing grounds at regular distances, each one of which will probably be provided with some form of flood-lighting capable of being switched on by remote control. Even then, however, the wandering charter pilot will still require some adequate lighting in case his very reliable engine fails.

To-day the tendency is towards built-in landing lights, but no machine can be expected to carry sufficiently powerful equipment to enable the pilot to pick out a landing field from a height of more than a thousand feet. The lights at present fitted are useful for picking up obstructions during a not-so-emergency landing, but would be of little real value when seconds count and when there is no chance of regaining height after discovering that a field is useless.

Furthermore, the ground mist which is, more often than not, prevalent at night can make the last minute use of a landing light rather dangerous on account of back glare. A minor mishap recently suffered at Croydon bears out this contention.

The Parachute Flare

NEVERTHELESS, the landing headlight is at present the only practicable solution to the problem, and the Air Ministry has sanctioned its use in place of other assistance. Wing-tip flares appear to be dangerous, not so much because they are liable to set the fabric alight in the air, but because a mishap while making an emergency landing would be much more serious with a naked flame in the vicinity.

What, therefore, of parachute flares, to be used, perhaps, only for real emergency landings and in conjunction with one or two headlights? We all know that these flares are liable to set fire to earthly objects, such as haystacks, but surely there is no insuperable difficulty in the way of making them harmless at the moment of touching.

Such flares can be fired off at regular intervals, so long as the pistol is easily loaded, and the final approach into a suitable field could be made with the aid of a landing light. There would then be no inflammatory difficulties, for the original flares would be burnt out before reaching the ground. Certainly the risks of a minor grass fire are fully outweighed by the added security to the pilot and passengers who are, in any case, in a very unenviable position.

Lawrence

AN interesting sidelight on the character of Lawrence of Arabia is supplied by Mr. Hubert Scott-Paine, of Supermarine and Power Boat fame, who has mentioned the subject in correspondence with the Editor. It appears that, although Shaw (as he was then known) was not responsible for the design of motor boats for the R.A.F., he was a very good boat pilot, and put in more engine hours in the British Power Boat Company's productions than did anyone else in the Service.

During the few years with the company Shaw put up some notable performances in the course of his testing and delivery duties; among them his run with an R.A.F. officer and crew from Hythe to the Firth of Forth, 500 miles in a gale, was an outstanding example.

"I have read most, if not all, of the obituary notes," says Mr. Scott-Paine, "and the most amazing part of them is that no one tells you anything about the man himself. He used to lunch with us frequently every week over a period of four years. Having come in from some boat outing cold and wet, and having warmed-up in one or other of the cabins of my yacht, he would open up discussions ranging from the British Empire to everyday events. Apart from saying that he had a wide knowledge of most matters, and seemingly spoke with authority on subjects I knew nothing about, I can only say that I found him a good companion and a grand shipmate, sympathetically inclined to all of the men who work for me and very deeply interested in the design that I have evolved, which I eventually convinced him, with a few other people who made up our own particular circle, would revolutionise all ship design."

Controllable-pitch Airscrews

THE leader in *Flight* of May 16, entitled "Controllable Pitch or —?" has aroused very considerable interest, and we have received a number of letters, many of them from the chief designers of aircraft firms. Empire Air Day and the expansion of the Royal Air Force have unavoidably crowded out this correspondence, but when it is published in next week's issue readers will find that it contains much that is of interest.

As was to be expected, there is nothing like agreement on the subject of whether the controllable-pitch airscrew is "worth while" on certain types of aircraft, or whether doped fuels or two-speed reduction gears will do all that is necessary. On the whole, the advocates of the C.P. airscrew have put forward the best case; the opposition are inclined to take the line of least resistance.

EMPIRE AIR DAY

*The Story of a Remarkable Achievement : Tens of Thousands Crowd
Ninety-odd Aerodromes : Service Flying as Seen from the Cockpit
by a "Flight" Representative*

OF the success of Empire Air Day, 1935, there can be not the slightest doubt, and those responsible—the Air League of the British Empire and the personnel of the many R.A.F. and civil aerodromes which co-operated—have every reason to congratulate themselves.

To every aerodrome and aircraft factory which was thrown open the public flocked in thousands, every man, woman and child overflowing with eager curiosity to find out how aeroplanes worked, and why. It would be interesting to know just how many questions were answered by willing and patient demonstrators at the ninety-odd aerodromes opened.

Lord Londonderry personally made a tour of a number of places in the D.H. "Rapide" of No. 24 (Communications) Squadron, while Sir Philip Sassoon visited several stations in his "Leopard Moth," and Air Comdre. Chamier, Secretary-General of the Air League, accompanied by Mrs. Chamier, made a lengthy tour in a Monospar S.T. 10 piloted by Mr. K. G. Seth-Smith.

A member of the staff of *Flight* was a passenger in a D.H. "Rapide" which, chartered from Olley Air Service, Ltd., by the Air League and flown by Capt. G. P. Olley, visited a number of aerodromes up and down the country. Some impressions gained here and there during this trip are given in the following notes, and they are followed by a more detailed description (by another *Flight* representative, who flew in Service machines) of typical programmes at certain R.A.F. stations. To describe the displays of every station would require a volume, but the majority of programmes were briefly set out in last week's *Flight*, and in most cases these plans were closely adhered to.

We left Hendon in the "Rapide" at 9 a.m. in dull and cloudy weather, but, heading north-west, soon ran into sunshine and a clear sky. Our first call was at Castle Bromwich, where No. 605 (County of Warwick) Light Bomber Squadron of the A.A.F. were wheeling out their "Wapitis" and



How the children revelled in it! This picture, centring round a "Tiger Moth" of No. 24 (Communications) Squadron at Hendon, is typical of scores of similar scenes all over the country.

"Harts" and roping off enclosures in anticipation of a big crowd later in the day; many visitors, it seemed, were likely to divide the day between the aerodrome and the British Industries Fair, which is immediately alongside it. Ultimately, a crowd of no less than 10,000 attended.

Continuing, we found Speke, Liverpool's Merseyside municipal airport, in a whirl of preparation for a visit by Sir Alan Cobham's display, with spectators already beginning to trickle in. Blackpool, which as yet is comparatively empty of visitors, was making no special arrangements at either of its two aerodromes, so we made southward for Sealand, Cheshire; here, dropping in soon after lunch, we found our first crowd—a little matter of 8,000 people from Chester, Birkenhead, Mold and other towns in the district—watching the work of No. 5 Flying Training School. In the morning, twenty-four aircraft of the School ("Tutor," "Atlas" and "Bulldog") had carried out a formation flight in the neighbourhood by way of a reminder. The flying programme during the afternoon showed the normal instructional routine, and the hangars, workshops etc., were open. One noticed, also, what appeared to be two large Rugger scrums; on closer inspection, parts of a long-suffering "Bulldog" and "Tutor" could be seen peeping out from the mass of eager humanity.

Next the route lay eastward to Cranwell, Lincolnshire, and on the way a formation of "Wallaces," which flew alongside us, marked the Hucknall display of No. 504 (County of Nottingham) Light Bomber Squadron, Special Reserve; the crowd on the tarmac looked a large one.

Cranwell's magnificent aerodrome, with the stately new Cadet College building backing the big hangars, seemed to hold the most impressive crowd of all—thousands of people drawn from Sleaford, Grantham, Lincoln, and the surround-



Juvenile interest in the Lewis gun on a Blackburn "Shark" T.S.R. machine at Gosport. (*Flight* photograph.)

ing district. The duties of the many and varied aircraft of the Cranwell Command were being demonstrated in a comprehensive programme which included aerobatics ("Hart" and "Bulldog"), formation flying ("Harts" and "Tutors"), flying training as it should and should not be carried out (instructor in one "Tutor" and alleged pupil in another), message picking-up ("Atlas"), attack on a ground party with gas bombs, parachute demonstration, wireless control, radio training in the Vickers "Valentia" "flying classroom," and—a bright thought—a supplies-dropping demonstration in which a parachute safely brought to earth a crate of beer! No unprincipled enemy having attempted to intercept this valuable cargo on its way down, it was auctioned in aid of the R.A.F. Benevolent Fund, to which good cause, incidentally, the modest admission fees paid by the public at all service stations were devoted. Cranwell, too, had staged a fine indoor exhibit of engines, equipment, etc.

Continuing, we arrived at Henlow, which houses the Home Aircraft Depot, just in time to see Sqn. Ldr. Sandbags and seven of his brothers make a simultaneous drop from a "Virginia," though, sad to relate, the parachute of one of this distinguished family failed to open. Parachute maintenance and testing is only one of the manifold duties of the H.A.D., which is responsible for major overhauls of practically all Service aircraft and engines used in Great Britain. The acres of workshops and engine bays, as clean as a new pin, were open to inspection, and crowds were taking advantage of the opportunity. One was constantly amazed, both here and elsewhere, at the public interest in technical exhibits.

We stayed to watch the display of aerobatics by "A" Flight of No. 19 (Fighter) Squadron from Duxford. "Magnificent" is the only word that describes the performance of the three "Gauntlets." The most impressive evolution of all was a series of upward half-rolls, rolls and double rolls in flight formation—not each machine rolling individually, but the whole flight rolling as one, the two outer machines pivoting about the leader. Their loops in echelon, too, were a joy to watch.

North Weald, near Epping, our final port of call, reported a crowd of 3,500 (a third of them children) and 900 motor vehicles. This station, which houses Nos. 29 and 56 Fighter Squadrons (the latter is McCudden's old unit, and they have his flying kit in the Mess) were concluding a long and varied

programme, in which shooting at the stop butts had been the most popular item, while the aerodrome's location near London had added interest to a display by Territorials with a searchlight and sound locator. Incidentally, no fewer than 160 visitors had asked for information about R.A.F. recruiting.

And so back to Hendon in the dusk, to find the three A.A.F. squadrons tidying up after a day which must have seemed like a premature Royal Air Force Display. 13,000 had attended—"top score" for any aerodrome during the Day.

And now to deal with some typical stations in detail. It is readily understandable why Biggin Hill, for example, proved so popular on the Day. Position, of course, counts for much, at least with those in whose minds thoughts of the relative merits of two-seater and single-seater fighters do not prevail. But for those who take pride and interest in the defence of the Metropolis—and we guarantee that their number has multiplied enormously since Empire Air Day last year—this station is a special attraction. For there, working literally side by side, are Nos. 23 and 32 (Fighter) Squadrons, armed respectively with the Hawker "Demon" two-seater fighter and the Bristol "Bulldog" single-seater.

With the "Demons"

The "Bulldog," having been our standard fighter for about five years, must be considered obsolescent, and the "Demons" used by "23" are not of the very latest type, for they use the original 480 h.p. Mk. IIS "Kestrel" giving them a speed of about 185 m.p.h. at 13,000ft., whereas the newer type, with its 600 h.p. "Kestrel V," is reputed to do better than 200 m.p.h. at the same altitude. What an outstanding performance even the older type can put up we found when we flew in one of those machines seen in the photograph overleaf. These, together with the photographic machine, were the only "Demons" "at home" on the day of our visit. The others were out on a "job of work," for the fighter squadrons always have something to keep them busy, especially so this year.

We are to fly, we find, in the flight leader's machine, and after photographs have been taken of the formation in the air we shall do what he hopes will be a spectacular breakaway from formation, after a dive on to the aerodrome—"a half roll off a loop or something like that."

Snug but clumsy in Sidcot suit and parachute harness, helmet, scarf and goggles, one scales the fuselage *via* footstep, wing and exhaust pipe, and slithers down over the gun mounting. Unlike the other members of the Hawker two-seater family, the "Demon" has its gun ring tilted at an angle to the line of flight, the fuselage, accordingly, being cut away in order to offer protection to the gunner from the airstream at high speeds. The parachute (observer's type) is carried either stowed in a receptacle behind the pilot's seat, where it is easily accessible and yet does not interfere with gunnery,



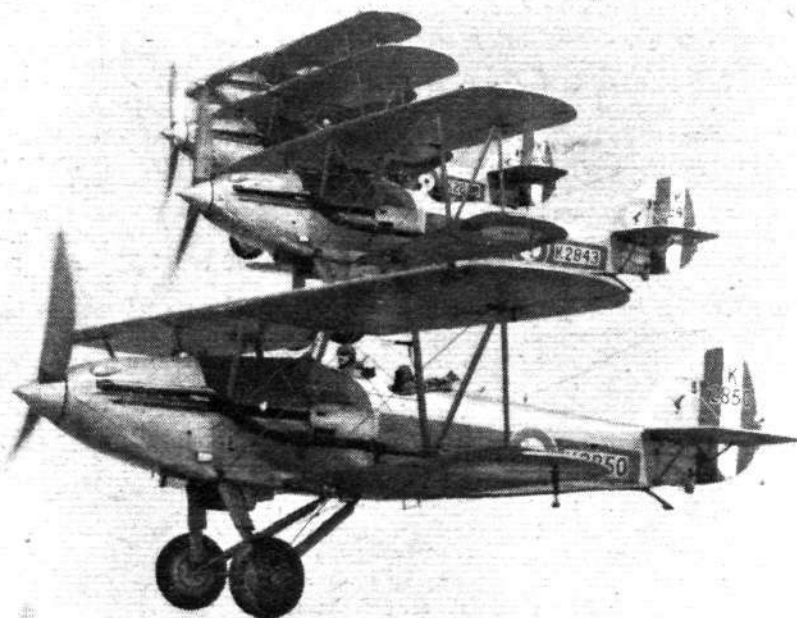
Trying out the smoke-producing apparatus on a "Bulldog" of No. 3 (F) Squadron at Kenley. Five of these machines did aerobatics with smoke on Empire Air Day.
(Flight photograph.)

(Right) The civil side: A number of factories were opened to the public, and this is a scene in the General Aircraft Company's works at Hanworth, with interested visitors examining a Monospar S.T.12 destined for the Heston-Croydon "ferry" service.





(Left) Lord Londonderry about to enter the Communications "Rapide" for an Empire Air Day tour.



"Demon" two-seater fighters of No. 23 (F) Squadron, at Biggin Hill, in "echelon stepped up" formation. (Flight photograph.)

or is attached to two hooks on the harness over the lower part of the chest. There is a small folding seat in the forward portion of the cockpit which, when extended, allows the occupant to sit in a normal fashion if he faces astern, or to straddle it and face forward, when he can conveniently rest his elbows on, or grip, the gun ring.

No form of Sutton harness is provided for the man in the back seat. He is anchored to the floor by a "safety wire" embodying a quick release and connects an eye on the harness at his nethermost portion to a fixture on the floor. In addition there is a metal noop on which the air gunner, should he wish to use his gun at a steep angle over the side of the machine, can stand, or against which he can brace himself during rapid manœuvres. The "Demon's" rear cockpit is void of instruments, but round its sides are pegs to take the 97-round magazine drums for the Lewis gun on the Hawker mounting. The pilot, incidentally, is more heavily armed than his gunner; he is provided with a pair of Vickers guns in the sides of the fuselage, with their breeches in his cockpit.

The safety wire is connected and, pulling forward the folding seat, one sits down facing forward, in which position one is well sheltered from the slipstream of the big geared airscrew. The four "Kestrels" are soon muttering, and the formation taxis out into position on the aerodrome and faces into wind. A glance round the sky to ensure that the "Bulldog" of No. 32 Squadron (this squadron shares Biggin Hill with the "Demon" unit) which is towing a drogue target, is well clear and the docile tick-over of the "Kestrels" changes simultaneously into a crackling supercharged thunder. Tails are up almost immediately, and soon the wheels of our neighbour on the port side are skimming the grass. The pilot does not need to "hold her down" for long in order to keep formation with us, and in a moment four polished noses are pointed skyward.

At 6,000ft. we are above the wisps of cloud over Kent and our consorts break away to take up their position in echelon on our right, or in Service parlance, to form "echelon to the right stepped up." The squadron has done very little serious practice toward perfecting this formation—one of the most difficult "in the book"—but are perfectly willing to fly in it for the *Flight* photographer. "Twenty-three" is like that!

Breaking away from echelon we assume a diamond formation for a few minutes, and then return once more to echelon. Once again we break formation, this time one by one, after the manner of dive bombers (Service pilots still refer to it as the "Hell Diver stunt"), wheeling over and down into a dive. We drop a few hundred feet and pull out, reforming into flight formation with the fourth "Demon" astern.

Our pilot turns in his seat and makes cryptic signs with

his hand, presumably indicating that we are about to ascertain if "the break up" can really be made spectacular. We make signs in return, probably equally cryptic, intending to convey assurance that we are "O.K." Then things happen. The "Demon" stands on its nose and our neighbours follow suit. Now we are looking the earth straight in the face, feeling that at any moment we are going forward clean through gun ring, pilot, dashboard, tanks and out between the cylinder banks of the "Kestrel" to finish up impaled on the airscrew shaft. Steeper and steeper the leader "stuffs it down," and the other machines, their pilots intent on the leader every second of the time (they are concerned only with keeping formation) assume an increasingly acute angle with the hazy horizon. The screeching, whining, roaring and howling increases, and the aerodrome circle, a few seconds back almost hidden by the pilot, has now become a halo round his head. About 220 we guess—this, undoubtedly, is the pull-out. More things happen. The horizon comes back, disappears, and returns at ridiculous angles. Then we are flying level once more—alone our zoom having carried us up far above our companions, whom we soon see side slipping in over the wood bordering the aerodrome to land.

Rolling Home

We indulge in a few private loops and an odd roll—in the middle of which one leaves one's seat for an inch or two, not of one's own accord, while looking up at the playful earth beneath (did one feel a gentle tug from the safety wire?) and then down in a final homeward dive. A circuit at 1,000ft., a sideslip over the fence, a crunch and a rumble, and we taxi to the hangars. Thence we stroll across the tarmac to visit No. 32 (Fighter) Squadron.

The "Bulldogs" of this unit have been showing plenty of the right spirit in their attacks with camera guns (carried on a lower main plane) on a drogue target, which is towed straight off the ground by one of their kind—a William Tell affair. One understands that the "Bulldog" is even nicer now, albeit rather slower, than when it first was adopted. There is a system of cockpit heating, wherein air is collected in a heater muff on each exhaust pipe and fed into the cockpit through two fittings in the bottom of the fuselage. The amount of warm air fed into the cockpit is controlled by the pilot. Wheel brakes and tail wheels have also been fitted.

As the duties of this squadron include the defence of London it has made itself proficient at leaving the ground in the shortest possible time on receipt of warning of raiders. From "stand by" the whole unit can be in the air within two minutes.

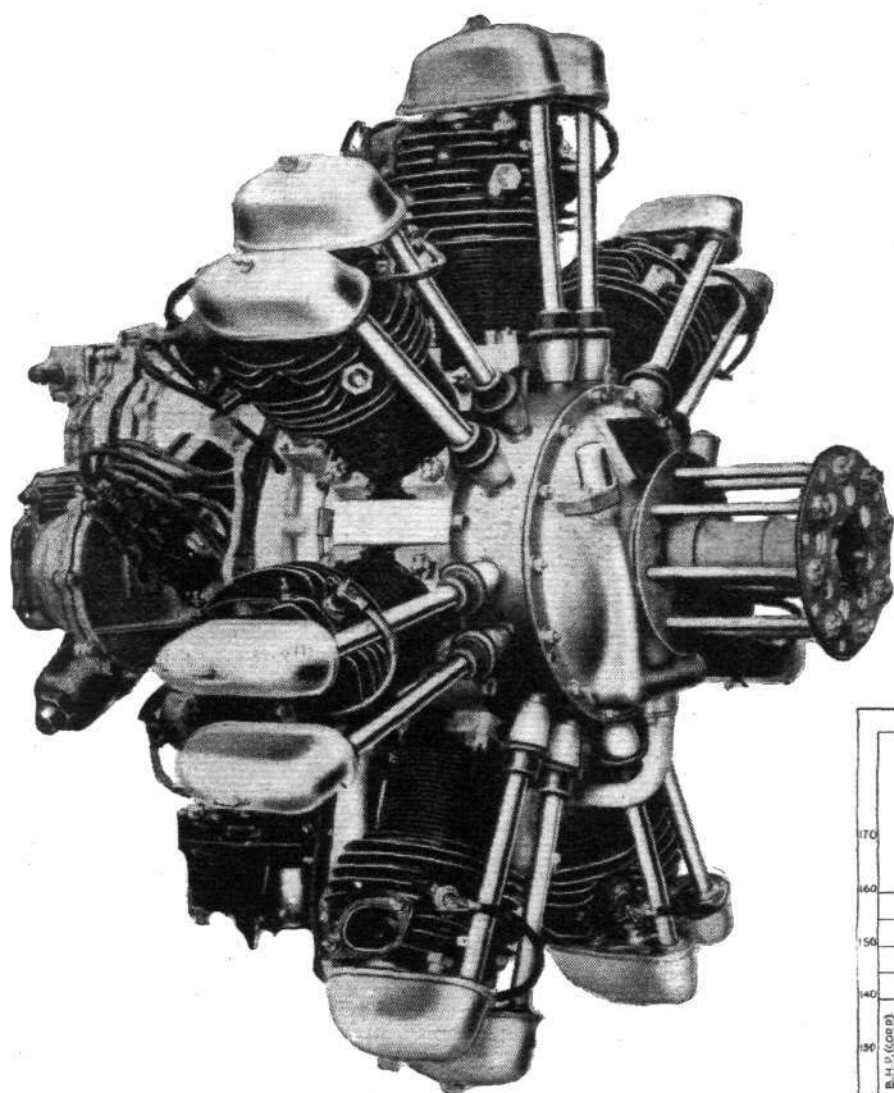
Over at Kenley—only six miles from Biggin Hill, and the home of Nos. 3 and 17 Fighter Squadrons—everyone seemed enthusiastic about Empire Air Day, and a comprehensive programme had been arranged. These two units were, we believe, the first two recipients of the "Bulldog," and both have attained a very high degree of efficiency on this aeroplane. One of No. 17's specialities is the low attack (a

Ideal for training ~ ~ ~

WOLSELEY

AQUARIUS

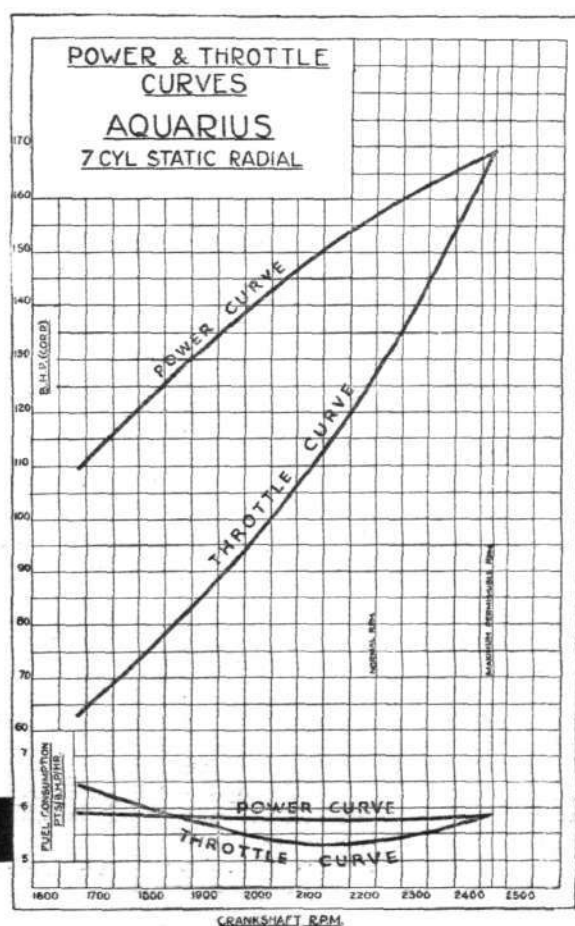
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The engine has successfully passed a 100 HOURS TYPE TEST under Air Ministry supervision. LONG OVERHAUL PERIOD. After 500 hours running at 9/10ths load, wear on major parts negligible.

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Governing Director: Lord Nuffield



Flight Photo.

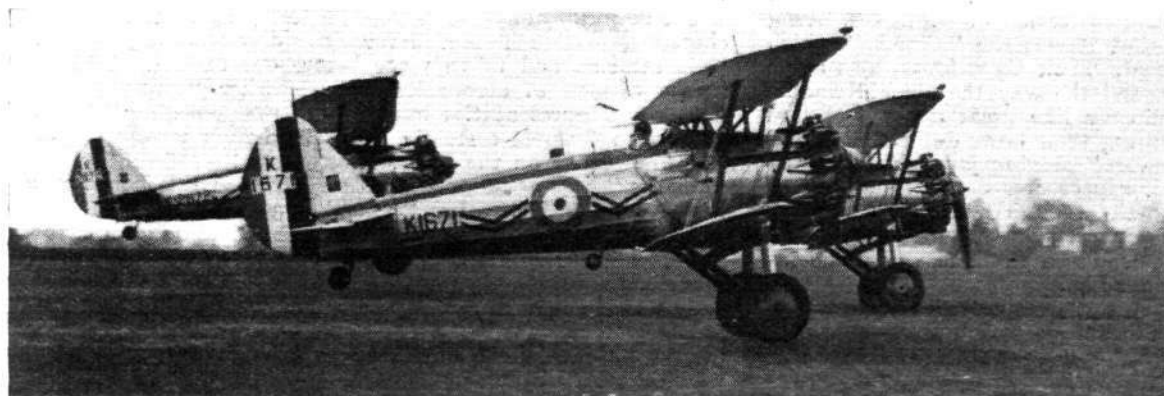
THE HAWKER "DEMON." Rolls-Royce "Kestrel" engine. A two seater aircraft possessing excellent fighting qualities and unequalled performance.

[ADVT.]



The three *Flight* photographs on this page show three stages in the "quick getaway," which is now assiduously practised by London's defence squadrons. In this picture pilots of No. 32 (F) Squadron are running from the crew rooms at Biggin Hill.

The end of the sprint—the pilots reaching their "Bulldogs," which are waiting with engines warmed ready to start.



Away within two minutes of the alarm. This last photograph, actually, is of "Bulldogs" of No. 17 (F) Squadron, Kenley, which also demonstrated this evolution on Empire Air Day.

demonstration was given on Empire Air Day) in which all nine machines dive out of a line astern formation on to a ground target, a convoy for preference, firing with their twin Vickers guns and "strafing" it with small bombs; in time of war these would probably be of the fragmentation or incendiary variety. A converging attack follows.

Among the spectacular items arranged by No. 3 Squadron was an exhibition by five machines of aerobatics with smoke—look for this event in the Hendon programme this year—for which the "Bulldogs" had special exhaust systems with long tail pipes, into which stannic chloride, or something of a similar nature, is introduced. They were having a spot of bother the other day: the smoke would insist on percolating through any little cranny near the tail and floating up the fuselage into the cockpit, to the discomfort of the pilot. This, however, did not prevent the "smoke flight" practising their act, which is rather similar to that given at the R.A.F. Display last year by five "Bulldogs" of No. 19 (Fighter) Squadron.

At Eastchurch, Isle of Sheppey, which we visited on the eve of Air Day, is the only air armament school in this country. Here officers and N.C.O.s are taught to become gunnery and bombing instructors, and airmen are trained as observers, bomb aimers and air gunners. The training programme of the school includes horizontal or high-altitude bombing, which is done from heights between 6,000ft. and 15,000ft., dive-bombing (of which more later), low bombing by fighters, air fighting with camera guns, carried out between 2,000 and 15,000ft., air firing at ground targets with fixed Vickers and free Lewis guns, and a certain amount of photographic work. Experimental machine guns of British and foreign manufacture are tried out and reported upon and new bomb sights tested.

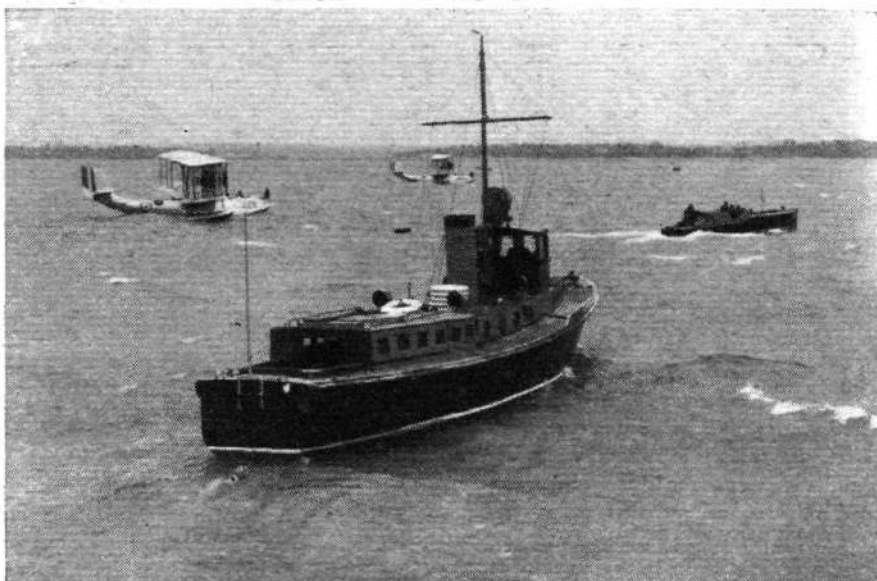
The spectacular and highly effective dive-bombing tactics

have not long been practised by the school. Hawker "Hart" light bombers are usually employed for the work, and although under war-time conditions they would be armed with their full bomb load of about 500lb., only practice bombs, having characteristics similar to their larger and more harmful brethren, are carried for training purposes. A floating target moored out at sea off Leysdown, which, of course, is also employed for horizontal bombing practice, is the object of the attacks. The crack R.A.F. dive-bombing squadrons are reported to start their dives at 12,000 or 15,000ft., but for practice, at least, the Eastchurch units divide such a dive into steps of two or three thousand feet, in order to acclimatise the eardrums of the personnel to the variations in pressure. The final dive is usually started between 5,000 and 6,000ft. and at 100 m.p.h. An angle of 50 deg. to 60 deg. is assumed, and speeds up to 250 m.p.h. are reached before the release of the bombs and pull-out at 2,000ft. Regular squadrons sometimes reach over 300 m.p.h. during dive-bombing. The accuracy attained is astounding. This new method of attack may be used to particular advantage against warships; the main fly in the ointment, so far as the pilots are concerned, is the multiple pom-pom or "scatter gun," which uses roughly a ton of ammunition a minute.

One demonstration of special interest was that of testing the synchronising gear used with fixed Vickers guns. A large disc of three-ply wood is bolted to the airscrew boss and revolves accordingly at the same speed as the airscrew. On the firing of the guns the bullets make holes in this disc at various points, depending of course, upon the r.p.m. of the engine, which controls the rate of fire. For example, when an engine is "wide open" it is possible that the gun is firing at the rate of 900 rounds a minute.



Do pilots like rope ladders? The crews of a "Southampton" flight embark on a pinnacle at Calshot to be taken to their machines.



Units of the Marine Craft section, Calshot, go out to bring ashore the personnel of "Southamptons." (Flight photographs taken on Empire Air Day.)

On the great Day we went south to Calshot in teeming rain, which, however, relented by the time Southampton was reached. Cutting wind failed to wreck the arrangements at Calshot, a coastal station made famous by the Schneider Trophy Races, and merely succeeded in making the events on the modified programme even more exciting.

Certainly the time-honoured "Southamptons" are making the most of their last days in the Service. Three of them put up a truly magnificent demonstration of taking-off, flying and landing in formation. But it was the "Clouds" which amused and amazed the crowd. Their tight formations alone were astonishingly accurate, and the way they would waddle out of the water up one slipway like great ducks and taxi round before the Castle, pointing their bows down the second slipway, with the twin "Servals" singing joyously when the wheels were barely retracted, kept scores of necks turning as surely as a Wimbledon match, though hardly so rapidly. When one managed to tear oneself away from watching the manoeuvres of these highly efficient amphibians, one found interest in abundance in the hangars.

There was, for example, the "Osprey" floatplane with sturdy and shiny Short "boots" of stainless steel, which, despite their ample proportions, do not prohibit the "Osprey" doing 170 m.p.h. A flight of "Panther"-engined Fairey "Seals" never seemed neglected, and a completely equipped "Southampton," with its collapsible dinghy and assortment of gadgets, was the scene of many a clambering, questioning, wagging and cooing. What a pity it was that the great Short R.6/28 had just been called away from Calshot!

Machine Guns and Music

Then there was the Marine Craft section, where some of the very latest things in the way of high-speed motor boats are stored and overhauled, the armoury with aerial and ground-type machine guns stripped and assembled, and an array of aerial bombs, the range where air gunners are instructed in the use of their weapons, and in the clearing of stoppages, and the photographic and meteorological section. Plenty of credit is due to the station's voluntary band, which paraded before the hangars throughout the afternoon; the Scottish element was very pronounced.

A forty-mile drive brought us to Gosport, and what a treat lay behind the forts and moats about the aerodrome! On the way to the tarmac we passed through a great hangar with a row of completely equipped, partially stripped, or skeleton aeroplanes on each side of the central gangway. There were "Baffins" and "Nimrods," "Ospreys" and "Vildebeests," "Sharks" and "Seals"; in fact, there seemed to be an example of every type employed by the Fleet Air Arm—for Gosport houses flights of the F.A.A. when they are not at sea—and for coastal defence. One has no hesitation in saying that there could hardly have been a finer show anywhere.

And what is the great attraction which causes the crowd to pause in clicking the locks of Lewis guns, stroking the vivid red noses of Mk. VIII torpedos slung beneath the "Baffins," "Vildebeests" and "Sharks" as though they were stray kittens, and rapping the metal fuselages of these latter

machines with hesitant fists? It is a D.H. "Dragon Rapide" from No. 24 (Communications) Squadron, which is about to take off with Lord Londonderry and a party after a visit. For the crowd it is a thrill which is not on the programme!

At the extreme end of the line-up of machines are two aeroplanes which, to the student of Service flying, are perhaps the most interesting on the aerodrome, the Avro 652 and D.H. 89 coastal reconnaissance machines.

The majority of events on the Gosport programme, which included formation flying, aerobatics, dive-bombing and torpedo attacks, had taken place before our arrival. However, if the display of aerobatics on a Hawker "Nimrod" fleet fighter was representative in quality of the preceding "turns," visitors to Gosport certainly were given their money's worth. The final event on the programme, formation flying by three "Sharks," was abandoned, and an air "battle" between the new Avro and a Hawker "Hart" was substituted.

The writer was fortunate enough to be allowed to act as "gunner" in the Avro. This is a four-seater low-wing monoplane with retractable undercarriage—a militarised version of the commercial Avro 652—and is fitted with two supercharged Siddeley "Cheetahs," giving a top speed in the neighbourhood of 190 m.p.h. In the nose there is a bomber's compartment, with the pilot's cabin, navigator's compartment and W/T compartment behind. To the rear of the W/T compartment is a gun turret, or "parrot cage," of the Armstrong-Whitworth type, half of which protrudes above the top fuselage decking. At present the take-off is somewhat extended, but split flaps and C.P. airscrews should (and probably will) attend to that.

We found ourselves at about 4,000ft. in a surprisingly short time, with the "Hart" manoeuvring for position. No gun was fitted to the mounting, details of which must, perforce, remain undescribed, but it was amusing enough to contemplate how many times one "drew a bead" on the "Hart." Certainly the 652 is an aeroplane fit for gentlemen to fight from; except in very tight turns, when "G" took a hand in the proceedings (despite her 56-foot span the Avro is astoundingly nimble), one could just sit and shoot or be shot at as the case might be. The "Hart" pilot tried all the usual forms of attack; he seemed to prefer sitting on the tail, following the Avro round, if necessary, in vertical turns. The beautifully proportioned two-seater made an emotioning sight set against the dark evening sky behind us, the horizon—now water, now land—sliding like a diorama behind it.

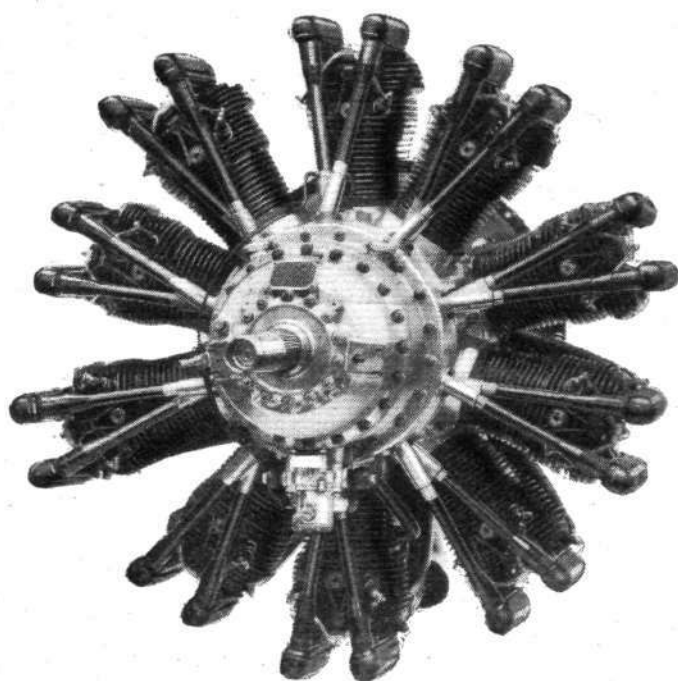
We learned on landing that while the Avro was climbing to a suitable height to hold the combat a "Vildebeest" had given a demonstration of torpedo launching practice. For this work a container in the shape of a "tin fish" is filled with water and carried on the torpedo crutches. At the appropriate moment for launching the projectile the pilot releases the water, thus lightening the "Vildebeest" and simulating the sensation of dropping a full-sized torpedo.

We were forced to leave Gosport while the line of machines was still swarming with insatiable civilians incessantly questioning the obliging airmen—to whom, as to everyone who took a part in the organisation of Empire Air Day, 1935, thanks and admiration are due.

SIDDELEY

SERVAL ENGINES IN SPAIN

EXTRACT FROM A LETTER
RECEIVED FROM LINEAS
AEREAS POSTALES ESPANOLAS



Madrid, 8th May, 1935

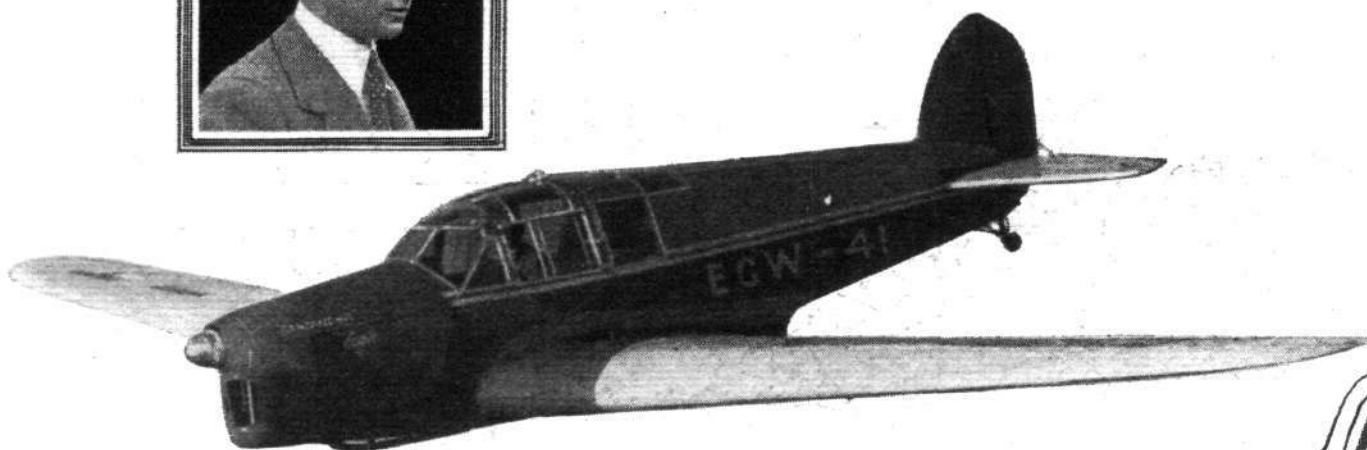
" . . . concerning the working of the Serval engines used by our company for the Sevilla-Canary Islands Line, I have pleasure in informing you that they have all completed 500 hours of running without any overhaul, some having been taken in for overhaul after having completed 650 hours of flight".



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THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

At the Royal Review

It is now announced that the general public will be admitted to Duxford for the Royal Fly-past on July 6. There will be accommodation at the aerodrome for 75,000.

The Cattle Truck

Two oxen have been flown 125 miles in a Canadian Fairchild freighter.

Death of American Race Pilot

Roy Minor, the brilliant American racing pilot, best known, perhaps, for his performances on the monoplane *Miss Los Angeles*, has died at the age of 31.

Soviet Nomenclature

The three monoplanes which the Soviet Government decided to build after the recent disaster to the *Maxim Gorki* are to be named *Vladimir Lenin*, *Joseph Stalin* and *Maxim Gorki*.

Visual Evidence

Mr. D. W. Douglas, who is delivering the Wilbur Wright Memorial Lecture before the R.Ae.S. to-night, is to show a film depicting well-known commercial aircraft in flight over the American routes.

Stranger Within Our Gates

A single-engined amphibian flying boat with "pusher" engine which, apparently, puzzled several readers in the London area, was the Supermarine "Seagull" from H.M.S. *Nelson*, which ship was in the Thames estuary. An illustration appears below.



MORE COMFORT AND PERFORMANCE: An improved version of the Mk. II Handley Page "Heyford" heavy bomber. Points to notice are the enclosed pilots' cockpit, four-bladed airscrews, which are driven by fully supercharged "Kestrels" of 600 h.p. and the bomb-aimer's position. The rear gunner's cockpit has also been modified. (*Flight* photograph.)

Large "Field" for German Race

Thirty teams, totalling 155 aircraft, were entered for the "German Flight, 1935," which started from Tempelhof on Tuesday. The competition is to last six days and the route lies over Silesia, East Prussia, North Germany, down the western frontier and over the Southern States.

"Tutoring" the Cadets

An Avro "Sea-tutor" floatplane has been issued to H.M.S. *Frobisher*, the sea-going training ship for cadets, for demonstration purposes.

H.M.S. *NELSON'S* Vickers-Supermarine "Seagull" appears to float on a sea of humanity during the ship's visit to the Thames Estuary for public inspection. The crane for hoisting out the flying boat will be noticed.

Gather Records While ye May!

A Douglas D.C.2, with Mr. D. W. ("Tommy") Tomlinson at the controls, has flown 3,105 miles over a closed circuit in 18 hr. 43 min., giving an average speed of 169.03 m.p.h. In addition to five internationally recognised load-carrying-over-distance records, Mr. Tomlinson reaped nine American ones.

Trials of the Pioneers

It is said of Mr. Donald Douglas, the famous American constructor, that he took leave of the U.S. Naval Academy, Annapolis, in 1912, after a model aeroplane, launched by him from a dormitory window, had stalled and made a crash landing on an Admiral's head. Mr. Douglas is at present in England.

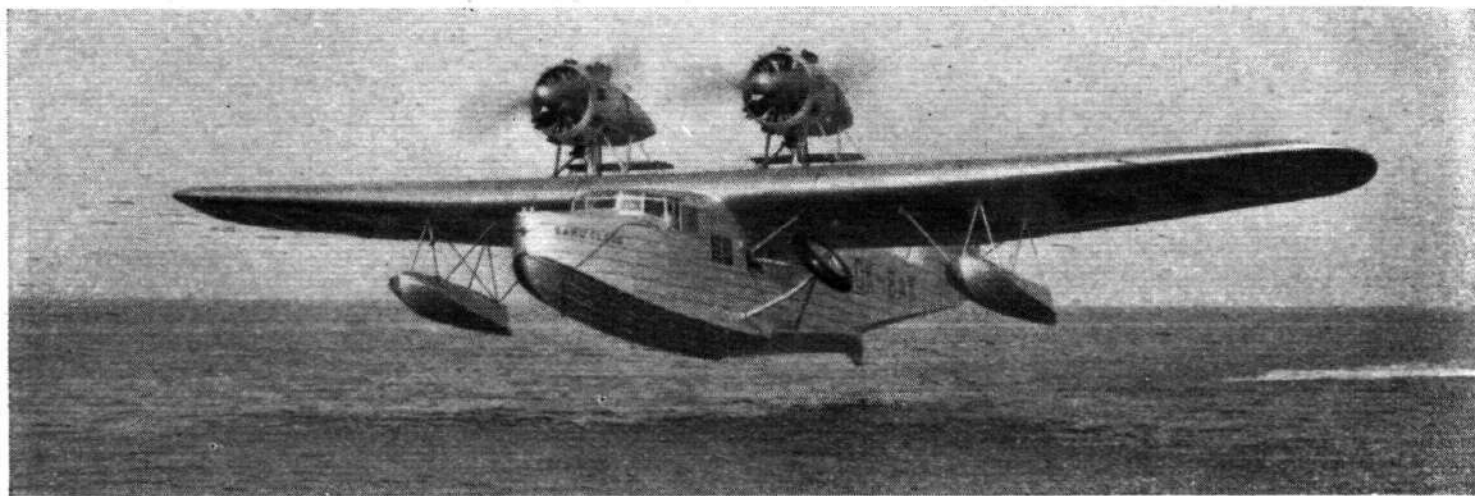
Twenty-five Years Ago

From "Flight" of May 28, 1910.

"It appears that there is a regulation in Germany against flying over inhabited areas, and it has just transpired that Mr. Latham last autumn was fined £7 10s. for his trip from the Tempelhof field to Johannisthal, while M. Jeannin, who recently flew from Johannisthal to Glienicke, had to pay 50s. for his offence."

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



FOR CZECHOSLOVAKIA : In last week's issue details were given of this Saunders-Roe "Cloud," which has been delivered to a Czechoslovakian operating company. The machine has been purchased so that the harbour at Susak may be used when the hill-surrounded aerodrome cannot be reached in bad weather.

THE WEEK AT CROYDON

*Imperial Veterans : No Empire Air Day at London's Airport : A Mysterious Douglas :
More Bullion Transferences*

ACCORDING to a very interesting Imperial Airways bulletin, Capt. Jones and Rogers have each spent over 10,000 hours in the air, whilst Capt. Youell and Wilcockson have almost completed the same number of hours. Capt. Drew, Dismore, Horsey, Perry and Walters have over 8,000 hours to their credit, whilst Capt. Travers has clocked over 7,000 hours.

Capt. Dismore took his ticket in 1913; Capt. Youell started flying at the age of sixteen; Capt. Walters holds the first Master Pilot's Certificate ever issued; and Capt. Jones, Travers and Wilcockson have all been flying for eighteen years. Capt. Rogers has done fifteen solid years' flying on Continental routes.

The Empire air routes all start from the Airport of London, yet Empire Air Day was not celebrated in any way at Croydon. So far as I know Imperial Airways, Ltd., made no flights round England to show the flag, and there was certainly no request by those responsible for Empire Air Day celebrations that a parade of aeroplanes should be held at Croydon. This was possibly all for the best at a purely commercial airport such as this.

Early last week Princess Arthur of Connaught travelled to Malmö by Scandinavian Air Express, leaving Croydon in a K.L.M. Douglas piloted by Cdr. Smirnov. On Sunday Cdr. Geisendorffer brought her back to Croydon in a Fokker F22. Princess Arthur travelled entirely unaccompanied, and on her return drove her own car away from the tarmac.

On Wednesday of last week Mr. Douglas flew to Holland in one of his machines. Mr. Anthony Fokker saw him off.

On the same day another of these machines, mysteriously registered X1331, arrived direct from Cherbourg in charge of Cdr. Tepas, of K.L.M. Later Lord Beaverbrook was seen on the aerodrome, and it is said that he has purchased this machine. Local opinion differs as to whether it is a wise move on the part of the alleged purchaser to buy a foreign machine, but the general opinion is that if a man has a free hand to buy where he likes he should buy what suits him, or what he thinks will suit him best. One super-patriot suddenly stopped arguing when he was reminded that his car stood just outside the door. At present the machine stands in a hangar, and there is talk of difficulties concerning import duty.

A smart bit of work was done by Imperial Airways re-

cently. Two Belgian Sisters of Mercy arrived at the West India Dock at 2.15 p.m. on board s.s. *Ingonia*, and were conveyed to Croydon by ambulance. They had come from West Africa and were suffering from an obscure tropical disease, for which special treatment was urgently needed. They left Croydon at 4.30 p.m. in *Boudicca*, piloted by First Officer Mack, and landed at Brussels at 5.59 p.m.—which was fast travelling.

About three-quarter of a million pounds' worth of gold reached London from Paris by air last week, mostly carried by Air France and Commercial Air Hire, Ltd. An "Envoy" of the latter company did two trips in one day fully loaded with bullion.

Cdr. Sillevs made a trip from Rotterdam to London in one hour, on a Douglas machine, and some of his passengers, who had ordered their private cars according to the timetable, had to wait a considerable time.

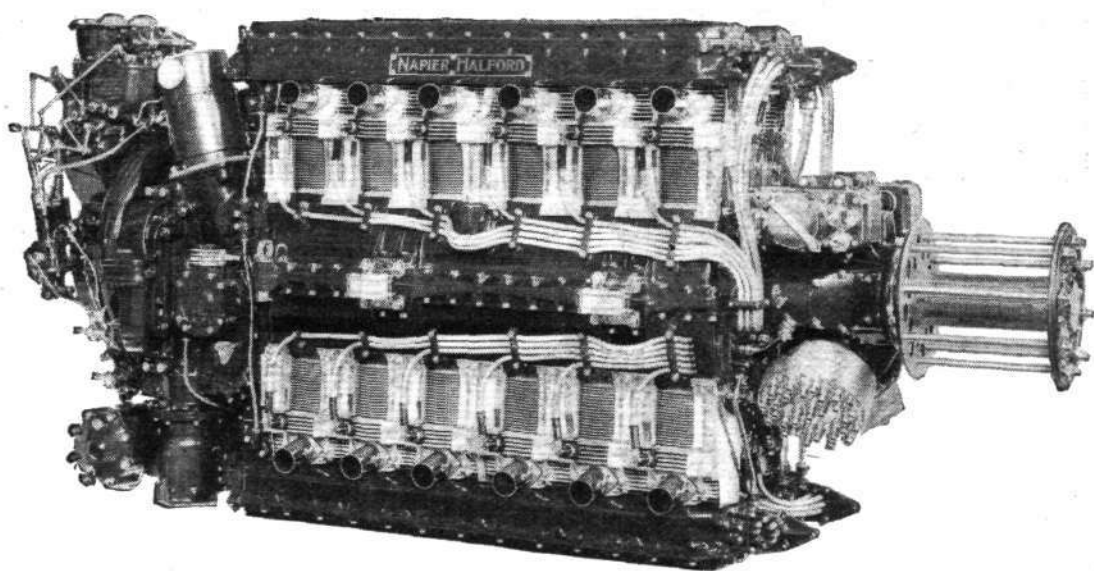
Recent enquiries from the Airport Authorities disclosed the fact that absolutely no reduction is given for large parties of Boy Scouts or similar organisations wishing to see over the Airport in charge of the official guide. Government encouragement of air-mindedness amongst the youth of the nation is, you will observe, a very real and vital thing. A. VIATOR.

The Guernsey Service

The first fortnight of operation is never likely to be a good one for a new air service, but the results have been very promising so far as Cobham Air Routes, Ltd., are concerned. The Guernsey service, which is operated twice daily from Croydon via Portsmouth and Bournemouth, is carrying fair loads, and there is no reason to suppose that this service should not be as much of a success as that to Jersey.

A hangar is being erected at Christchurch Aerodrome, Bournemouth, for the benefit of one of the four "Wessex" which are used for the sea crossing, and the aerodrome at L'Erée is to be improved and extended in due course. Since it was first published, the time-table has been slightly modified, the sea journey taking some fifteen minutes longer on each run than was originally expected. The Cobham pilots are Messrs. C. Bebb (who flies the Croydon-Bournemouth section), P. Beresford and R. Ogden.

Dagger

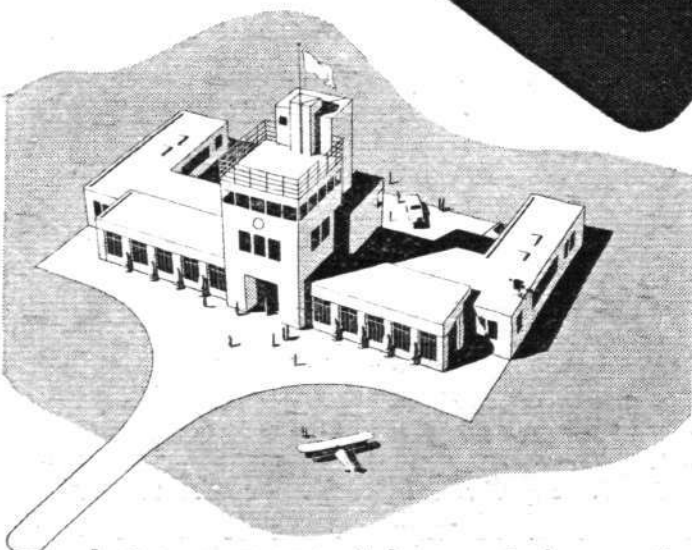


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BIG HILLMAN EXTENSIONS

One New Internal and Two New Continental Services : More Glasgow and Paris Services

EVEN the most optimistic of the various rumours that have been current will be improved upon when Hillman's Airways open their summer season on June 6.

The programme includes two new Continental services, four return trips to Paris, two returning services to Belfast and Glasgow, and a service between Hull and Belfast. Furthermore, the scheduled times between London and Paris should be appreciably reduced as the new D.H. 86 machines are put into service, and the first of these should be delivered in time for the opening of the programme.

These 86's, three of which have been ordered, will carry both first and second officers, the latter acting also as radio operators, and Hillman's will, therefore, be following the system of Imperial Airways in training their own pilots in actual service. The first "Express" will have complete dual control and the others will have the swing-over type. Recent visitors to Stapleford will have noticed many new faces among the pilots, and there are now, we understand, eleven with the company.

Paris machines will leave Essex Airport at 9.00, 12.00, 15.00 and 18.00 hours, and will leave Paris at the same times, save for the last service, which leaves Le Bourget at 18.15 hours. The trip is scheduled at present to take 1 hour 45 minutes. As might have been expected, the fares have been slightly increased, and these are now £3 single and £5 10s. for a period return. Until all the 86's are delivered "Rapides" will also be used on this service.

At present the comparatively bulky load of mail for Ireland and Scotland takes up the greater part of the space in the cabin of the northern "Rapide," so it is not surprising that a second service is to be put on. Machines will leave Stapleford at 10.00 and 14.00 hours and will leave Glasgow at 8.30 and 16.10 hours. As before, stops will be made at Liverpool

and Belfast (Newtownards). People need no longer complain that they are forced to leave Glasgow at an unreasonably early hour.

The new internal service overlaps, to some extent, that already run by K.L.M., and it will be interesting to see whether the pioneer over the route, being a Continental company, will still be permitted to carry passengers over the English section. Hillman's are to run a single return service between Hull, Manchester, Liverpool and Belfast, leaving Hull at 9.30 and Belfast at 15.30 hours. This service, which will be run with "Dragons," meets the northbound machine at Liverpool, and may, on occasion, take over some of the Irish mail. The overall fares are £4 single and £6 return.

D.H. "Rapides" will be used on the long-expected Brussels service, which will be run three times daily, calling also at Ostend. Machines will leave Stapleford at 10.00, 14.00 and 18.00 hours, and will leave Brussels at the same times. The Belgian authorities insist on the use of W/T and an operator will be carried on each service. The through fares will be £3 15s. single and £5 15s. return, while between London and Ostend they will be £3 and £4 10s. respectively. As in the case of the Paris service, cheaper return fares are offered for short periods.

The second new Continental service is, in reality, a Channel ferry service, and will be started just as soon as the new Margate airport is ready for use—probably early in July. A "Dragon" will leave Stapleford at 9.00 and will thereafter make four return trips between Margate and Ostend, returning from Margate at 19.15 hours. Once again both a pilot and a wireless operator will be carried, and the return fares are: London-Margate, £1 10s., and Margate-Ostend, £2 5s. This service should be popular with visitors—if only to allow them to tell their friends that they have been to the Continent!

Edinburgh at Last

According to the promises made the Air Ministry have now offered Turnhouse aerodrome for use to operating companies while the Edinburgh municipal airport is being prepared, and last Monday North Eastern Airways flew through to Edinburgh for the first time since the inaugural trip.

Some slight changes have been made in the time-table, and "Envoys" now leave Heston at 11.30 a.m. and 5.15 p.m., reaching Edinburgh at 2.30 p.m. and 8.15 p.m. On the return journey they leave Edinburgh at 9.20 a.m. and 3.55 p.m. The first service, incidentally, with the help of Mr. Pugh's Inner Circle, makes a connection with the Imperial Paris machine leaving at 1.30 p.m. and arriving there at 3 p.m., so Edinburgh people can reach or return from Paris in about six hours.

It transpires that the forced landing near Ripon in a snow-storm a fortnight ago was caused by "refrigerated carburation"; the pilot just failed to reach a good field with fading engines. Mr. V. J. Wheeler was, luckily, very little hurt, though the "Envoy," *Swaledale*, was more or less written off. This, however, was the only uncompleted service, despite the fact that another "Envoy" was slightly damaged a day or two later.

In the Far North

On Monday Aberdeen Airways opened their Thurso and Kirkwall service, leaving Dyce airport at 9.30 a.m., and returning at 2.30 p.m. There are now, in fact, two distinct daily services to the Orkneys, and their line in no way clashes with that operated by the pioneer company, Highland Airways. The Newcastle-Hull-London service will be opened within a fortnight. Dyce, incidentally, will probably be an "open" airport within a month, and Aberdeen Airways, in view of possible K.L.M. co-operation, are making an application for Customs facilities.

Although there are, of course, two sides to every question, it is only fair to say that Aberdeen Airways have done everything in their power to come to an agreement with the pioneer company. It appears probable that the difficulties of duplication will eventually sort themselves out.

Ringway at Last

The Cheshire County Council and other objectors have failed in their appeal against the Manchester Corporation. Ringway will become Manchester's airport.

The New D/F Stations

Judging from the list of civil control areas given in the cloud flying *Notice to Airmen* (No. 47), both Birmingham and Plymouth are to have radio in the near future. Bristol's plans were outlined in last week's issue, and Renfrew, Glasgow, would appear to be a certain D/F aerodrome, though, for the sake of R.A.S. and Hillman pilots, the Air Ministry might hurry things along. The Heston controlled area, incidentally, is bounded by lines joining Henley, High Wycombe, Rickmansworth and Chiswick, following the Thames from there to Kingston, and joining Kingston, Dorking, Brooklands, East-hampstead and Henley.

Heston's control and radio station are now working well.



At Malmo : Princess Arthur of Connaught travelled by air to the Royal wedding in Stockholm. She is seen here being received after disembarking from the A.B. Aerotransport F 22, Lappland, at Malmo airport.

Commercial Aviation

And Now—Wake Island

After dealing with Midway Island, the Pan American supply ship, *North Haven*, with its complement of engineers, has now reached Wake Island, 1,400 miles farther west. Last week the temporary radio equipment was used to report to Alameda, Honolulu and Midway.

Sea and Air

Arrangements have now been made between the principal British and Dutch steamship lines serving India, Ceylon, the Straits, China, Japan and Australia and the British and Dutch air lines whereby the traveling public is offered facilities for travel either by sea or air. The arrangement comes into operation on June 1.

Croydon's Chief Retires

AFTER nearly twelve years' association with the Airport of London, Major L. F. Richard is leaving the aerodrome he has watched growing from a motley collection of wooden huts to the Terminal Airport it is to-day. He is retiring on account of ill-health directly attributable to wounds and the loss of a leg whilst on active service.

He himself endorses the medical opinion that his disability prevents him from carrying out the active and arduous duties connected with his position of Chief Aerodrome Officer at Croydon. Major Richard has held that position since 1926, and he has been very largely responsible for the highly efficient organisation at Croydon, which has kept pace with the growth of air traffic, necessitating, amongst other things, the complicated system of air traffic control now in use.

Major Richard was educated at Clifton and the R.M.A., Woolwich, afterwards being a Gunner until he took his ticket in June, 1914, and obtained his wings in the R.F.C. in 1915. In the same year he "ran into Archie" when flying a B.E.8 (at its ceiling) sustaining a broken arm and a shattered leg.

His observer, Major L. M. Wells-Bladen, was also badly wounded, but Major Richard managed to get the machine down near Bailleul without further damage to himself or to his companion. Later his wounds necessitated the amputation of a leg.

Subsequently he was promoted Flt. Commander with a night flying squadron at Thetford, and was in charge of the Civil School, Hendon, promoted Major, and between 1917 and 1919, he was in charge of the New Romney School of Aerial Gunnery, where he learned to fly over again, in spite of his disability.

Such was his enthusiasm for flying that once more, in 1934, he took up flying again and took his ticket on an Autogiro at Heston—a fact which few people realise.

During his time at Croydon he has made many friends and no enemies, despite the variety of elements which go to form a big international community. The main secret of his success has been wisdom and tact, and a sympathetic understanding of those he has had to deal with.

With rest and treatment there is every reason to hope that he will recover his health, and it may be that we shall see him back again in commercial aviation at a future date. Certainly he has a store of knowledge and experience of airport and airline organisation second to none in this country, and it is not to be expected that a man who has learned to fly three times will be content to remain in retirement when commercial aviation is, at last, in a flourishing and progressive state.

Whatever he does in the future he may be sure of the warm support of his many friends of the commercial aviation community at Croydon. It is gratifying to be able to announce that Major Richard has received the Jubilee Medal in recognition of his services to civil aviation.



Major L. F. Richard.

False Pretences

Apparently some person unknown is going the rounds in London under the name of either Malcolm or Capt. Fresson in an endeavour to obtain "loans for Aberdeen Airways." The few people in this sad world with money to invest should, if accosted by such a man, ask for credentials.

The Rome Service

The weekday service between London, Paris and Rome, operated by Air France and Ala Littoria, opens on June 1. Passengers leave Croydon at 10.30, and fly either in a twin-engined Potez 62 or a four-engined Savoia-Marchetti to Lyons, Marseilles and Rome, which is reached at 7.15 p.m. In the reverse direction the service leaves Rome at 6.30 a.m. (not 7 a.m., as stated in the time-table), and reaches Croydon at 3 o'clock. This service duplicates, in some measure, the existing service *via* Genoa.

The Birkett "Merlin"

Birkett Air Service have now taken delivery of their Miles "Merlin" (described in *Flight* of April 4) and are now in a position to carry out non-stop flights, with a single-passenger or with equivalent freight, of 1,400 miles at 140 m.p.h. The machine has, of course, a standard airscrew in its present form, but even so the take-off with full load takes only a matter of 18 seconds or less.

Although the exceptional range and speed will be valuable features for charter work, the machine's passenger and luggage accommodation without the special tanks must not be overlooked. The majority of charter flights are of the shorter variety, and the "Merlin's" ability to carry four passengers at a high cruising speed makes it an attractive proposition. In addition to Mr. G. Birkett, Messrs. E. H. Newnman, R. E. Watts and I. K. Megaw are the present pilots for the company.

The Isle of Man Network

From a provisional time-table which has just reached this office from Blackpool and West Coast Air Services one gathers that the air over the Irish Sea will be flocked with "Dragons" after June 1.

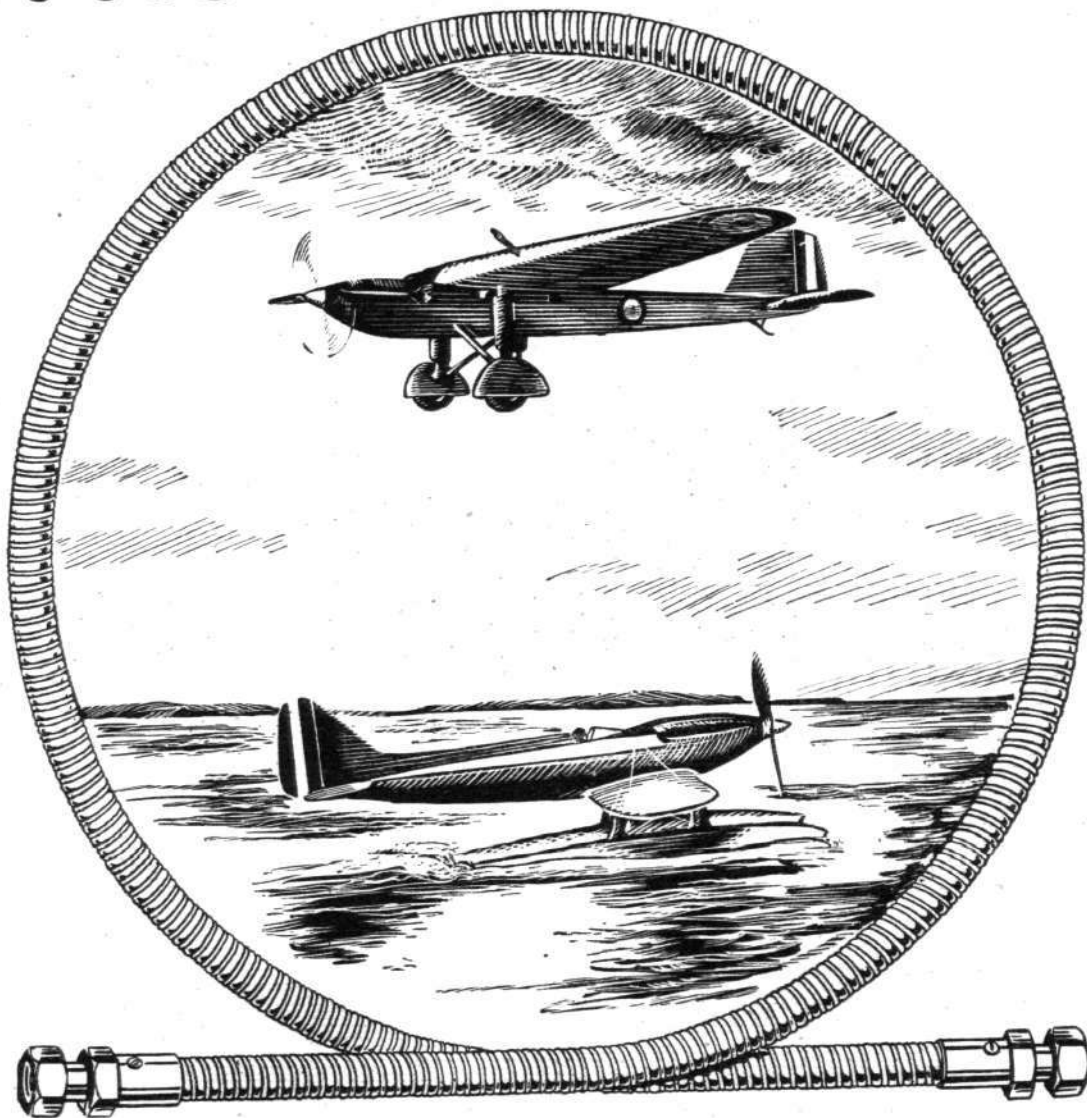
Actually three return services will be run every day between Liverpool and the Isle of Man. Two daily return services will be run between Blackpool and the Island, with an additional one during the week-end. Single return services will be operated between Liverpool and Manchester, and between Manchester and Blackpool. Single return services will also be operated between the Island and Carlisle and Belfast (Newtownards) the latter, possibly, as foreshadowed last week, being extended to Campbelltown, though there is at present some doubt about this.

In addition, services between Liverpool and Blackpool will run from Liverpool on "even" hours and from Blackpool on "odd" hours between 9 a.m. and 8 p.m. The arrangement of equipment for such an extensive network is particularly interesting and can be followed by means of the diagrammatical time-table which will, no doubt, be published shortly. This time-table is similar to the very excellent one published by D.L.H. for its internal services.

Meeting the Boat

Originally formed with the idea of making a feature of meeting transatlantic liners and taking passengers swiftly to London or to any other destination, British-American Air Services, of Heston, have met difficulties with the Irish Government as far as Queenstown is concerned. Presumably the Government wish to run their own service but have so far made no move. However, Mr. Douglas Gibbs, one of the directors is at present on a visit to the States, and there is every chance that the problem will be solved from that end.

Meanwhile, the company is going ahead with general charter work and makes a point of flying to all race meeting of any importance, whether these races are for quadrupeds or for wheeled vehicles. The fleet consists of a D.H. "Leopard Moth" and a D.H. "Dragon," but a "Rapide," to have the most luxurious equipment, is on order, and Mrs. Gibbs, who is in charge of the office at Heston, has, for her own use, ordered a D.H. "Hornet Moth," which can also be considered as part of the future fleet. The rates are 1s. a mile for the "Leopard," 2s. a mile for the "Dragon," and 2s. 6d. a mile for the special "Rapide"—with special rates for charters of three hours or more. All the machines, with the exception of the "Hornet," are or will, it is understood, be equipped with radio. Mr. A. J. Edmunds, a director, is chief pilot, and Mr. R. J. Barrett has recently joined the company as assistant pilot.



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AUTOMATIC ENGINE CONTROLS

Operation of the Various Hobson Systems

By ERNEST W. KNOTT, M.I.A.E., M.S.A.E.

(Continued from page 25)

MODERN aircraft carburetters require an altitude control capable of weakening the mixture strength by at least 40 per cent., and it is only too obvious that abuse of this available range of mixture strength through inexperience or inattention on the part of the pilot can either cause excessive waste of fuel or, on the other hand, destructively high engine temperatures.

Many attempts on long-distance flight records have ended abruptly because the pilot, in his anxiety to conserve fuel, has damaged his engine through using too weak a mixture ratio for the conditions under which the machine was being flown.

Many kinds of devices for automatically operating the

altitude valve on the carburetter have been evolved, but they all had certain weaknesses, either of a mechanical nature or else limitation of the degree and accuracy of control.

The Hobson-Penn Automatic Mixture Control was developed along lines completely foreign to all preconceived ideas, and was based on the following discovery.

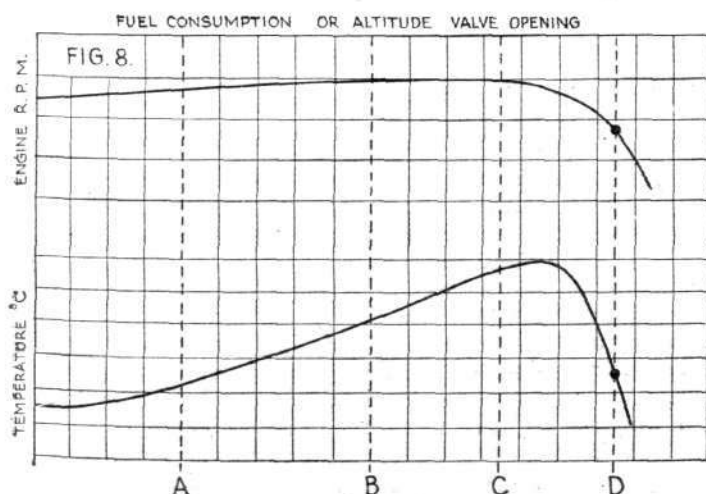
Mixture Control

It is a well-known fact that as mixture strengths are weakened to the point where maximum power is maintained with minimum fuel consumption—known as W.M.M.P.—engine temperatures approach a dangerously high point, so that carburetter settings are always used giving mixture strengths sufficiently richer than the ratio giving W.M.M.P. for temperatures to be safe for continuous running. It was found, however, that if the mixture strength was reduced considerably below that for W.M.M.P. and it was accompanied by a fall in revolutions, engine temperatures fell also to a safe degree, and extraordinarily low fuel consumption figures were obtainable. A typical curve is shown in Fig. 8.

The Hobson-Penn device, therefore, was developed as a two-stage control in which the pilot was given only two alternative mixture strengths, the normal one for maximum power, acceleration and manoeuvrability, and the other weaker than W.M.M.P., which accompanied by a drop in revs gave fuel economy, and thereby a considerably extended range.

Official tests have shown that this device, when properly installed, will increase the cruising range of a machine by 20 per cent. over that obtained by the most experienced test pilots.

The advantage of such a device in the hands of unskilled pilots needs no elaboration, a difference of as much as 50 per cent. being commonly recorded between similar machines fitted with an ordinary manual mixture control, flying under identical conditions, but with different pilots. The fact that the instrument is a two-stage type renders



Curves of mixture strengths and cylinder temperatures: (C) weakest mixture for maintaining power; (B) normal power mixture ("Rich Automatic"); (D) cruising mixture strength, giving drop in revs with safe drop in temperature and steady running ("Weak Automatic"); (A) twelve per cent. richer than (B) for take-off boost.

it impossible for the pilot to use mixture strengths at or in the neighbourhood of W.M.M.P., and the engine is thereby safeguarded against seizure due to abnormally high temperatures, and the utmost range is secured for a given fuel tankage.

The device operates the altitude valve for changes in altitude whether put in the "rich automatic" (power) or in the "weak automatic" (economy whilst cruising) position.

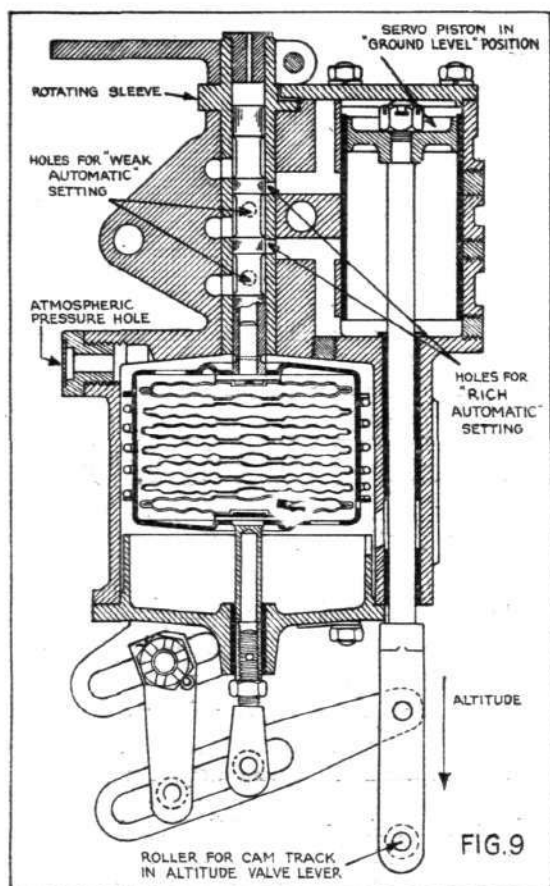
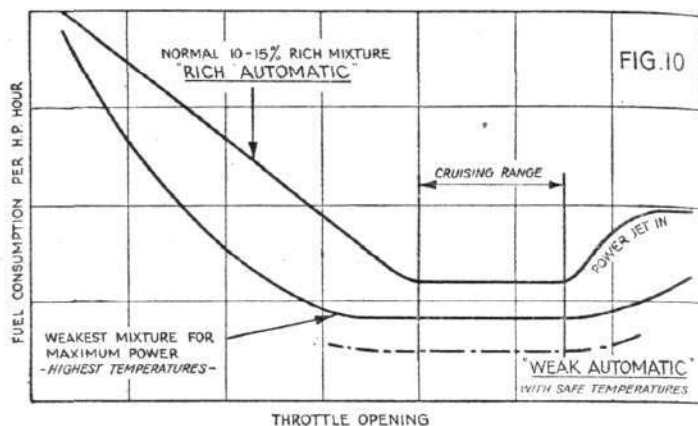


Fig. 9 shows the internal construction of the Hobson-Penn Automatic Mixture Control, which is the subject of British and foreign patents. It will be seen that it contains a barometric bellows, valve gear and servo piston, very similar to Hobson Boost Control but with the following differences:—

The bellows chamber is open to atmospheric pressure instead of being affected by boost pressure. One end of the bellows is linked up to the servo piston in such a way that a change in atmospheric pressure causes a small and not complete stroke of the piston, and surrounding the valve is a rotatable sleeve containing two sets of holes at different heights. Rotating this sleeve opens up one pair of holes, closes the other pair, and causes the servo piston to choose one or other of two "zero" positions, from which it is sensitive to changes in altitude.

In the "rich automatic" position at sea level the piston is at the extreme top of its stroke, and has a total movement of approximately $1\frac{1}{2}$ inches. Movement of the sleeve to uncover the second pair of holes causes the piston to take up a second "zero" position farther down the cylinder, and its movement with increase in altitude commences from this new point, the piston travelling to the extreme lower position at very high altitudes. The distance between these two pairs of holes in the sleeve varies with different makes of engines, and depends on the drop in mixture strength that is found to be most suitable between the "rich automatic" setting and the "weak automatic" setting.

Once this difference is found and the necessary adjustments and certain mechanical details settled, they remain constant for any particular combination of engine and



carburetter, and can be reproduced for production engines with every assurance of similarity in performance.

Whilst altitude conditions can be simulated at ground level on the intake side of the engine, reduced air pressure conditions on the exhaust side can only be reproduced by the use of very large experimental plant, which is very costly and somewhat dangerous to use.

It is necessary to make certain flight tests at different altitudes and speeds to determine the required engine characteristics, and it is also necessary for the carburetter curve to be as flat as possible throughout the cruising range, with a power jet coming in when approaching full power condition, as shown in Fig. 10, in which three curves, viz., W.M.M.P., "rich automatic," and "weak automatic" are shown.

In addition the altitude valve of the carburetter must give a straight-line curve, i.e., it must give progressive and equal changes in mixture strength for progressive and equal movement of the altitude valve, and must not be affected by varying throttle openings.

Engines cruising at part throttle on extremely weak mixtures become increasingly difficult to accelerate, the ordinary plain accelerating pump being unable to cope with the demands of the engine, as most of its discharge is deposited on the walls of the supercharger. The Hobson Delayed-action Pump has been designed to overcome this difficulty and functions as follows:—

The first movement of the pump operating lever throws a mass discharge of fuel into the carburetter intake, which thoroughly wets the walls of the supercharger, and is immediately followed by a sustained discharge, which gives the necessary mixture enrichment while the engine accelerates from slow running to normal full-throttle conditions.

Safety Devices

Instances have been known where automatic mixture controls of the single-stage type have failed through puncture of the pressure-sensitive bellows, with the result that the mixture strength remained in the altitude condition and forced landing had to be made owing to mixture weakness causing the engine to cut out near the ground.

The Hobson-Penn automatic instrument does not use a single bellows, but a stack of capsules housed in a retaining case which limits their maximum expansion. The failure of any one capsule causes only a slight weakening in mixture strength—insufficient to make the engine unmanageable. Sticking of the valve is obviated by the spring surrounding the capsule retaining case becoming coil-bound and allowing the servo piston to exert the whole of its force on the valve.

A summary of the advantages so far obtained by the combined use of a Variable Datum Boost Control and the Hobson-Penn two-stage Automatic Mixture Control is interesting:—

(1) The pilot cannot give his engine excessive boost pressures and need not watch his boost gauge. Yet he can get additional power for take-off, as well as pro-

gressive throttle opening and a fine degree of control over engine speed.

(2) He cannot run on mixture strengths that will be either too weak or wasteful, need not alter his mixture control lever with changes of altitude, and need not judge mixture strength by watching his thermometer, boost gauge and altimeter.

On the other hand, it is possible, through forgetfulness or if the pilot's attention is engaged elsewhere, for him to fly with his throttle lever fully open whilst the mixture control is in the "weak automatic" position, and the Hobson Pilot's Cockpit Control was designed to prevent this.

This particular device so interlocks the pilot's throttle and mixture levers that the "weak automatic" setting can only be used with the throttle lever in the safe cruising range, any movement of the latter outside of this safe range of cruising speeds either to the full-throttle or slow-running positions automatically shifting the mixture lever to the "rich automatic" position.

Two views of this control are shown in Fig. 11. A third position of the pilot's mixture lever is the "over-ride" position, which keeps the mixture control at the "automatic rich" setting, but over-rides the boost control and opens the enrichment jet valve. This is the position in which the pilot sets his mixture lever for take-off.

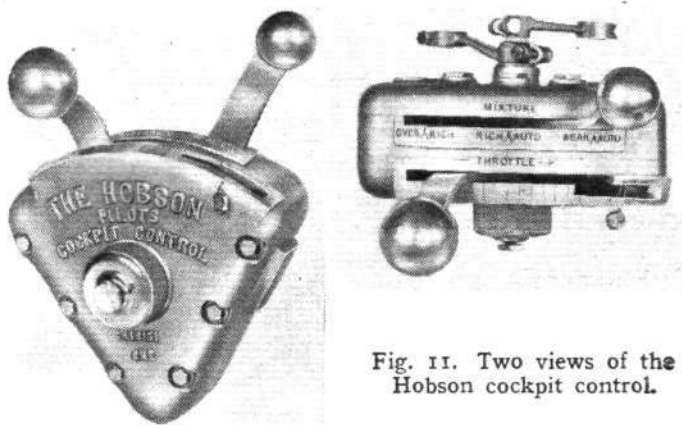


Fig. 11. Two views of the Hobson cockpit control.

The pilot also has an emergency throttle position, which can only be reached by going through a gate protected by a seal. Should, in a grave emergency below rated height, the pilot want maximum power output, even if it may badly strain the engine, movement of the throttle lever through the gate over-rides the boost control, and, in addition, mechanically opens the carburettor throttle to its wide-open position; but to minimise the possibility of damage, the rich mixture jet is automatically opened. As damage if any, may not show up until some later period, it is intended that the breakage of the seal shall be recorded in the log-book, and the engine examined before it is put into service again.

Cruising on Ultra-weak Mixtures

The subject of a further patent is the use of mixtures weaker than is normally used for cruising, in conjunction with considerable extra ignition advance. It is so arranged that the interconnection between the Hobson Pilot's Cockpit Control gives retarded ignition for slow running, an extra degree of advance during the cruising range on ultra-weak mixtures, some retardation at full boost and further retardation for take-off boost and emergency over-ride.

It will be seen, therefore, that a scheme has been evolved which renders it impossible for the pilot to so mishandle his controls that he can damage his engine, or make a mistake which might endanger his life or the machine. He is relieved of all responsibility for the

welfare of the engine, and it enables him to give his undivided attention to flying and navigation.

The psychological effect of such a "robot" scheme on a pilot, particularly in aerial warfare, which may be taking place at rapidly varying altitudes, needs no lively imagination.

Automatic Ignition Control

In multi-engine machines it is not feasible to hand-operate the ignition timing—which requires a fast-moving cam—owing to slogger and springiness of the machine control.

The Hobson Automatic Ignition Control device (shown in Fig. 12) which operates to time the ignition in accordance with induction pipe pressures, is devised for use on multi-engine machines. In these circumstances, and acting in consonance with boost pressure changes, it can be made also to operate the carburation heat control and other engine adjuncts.

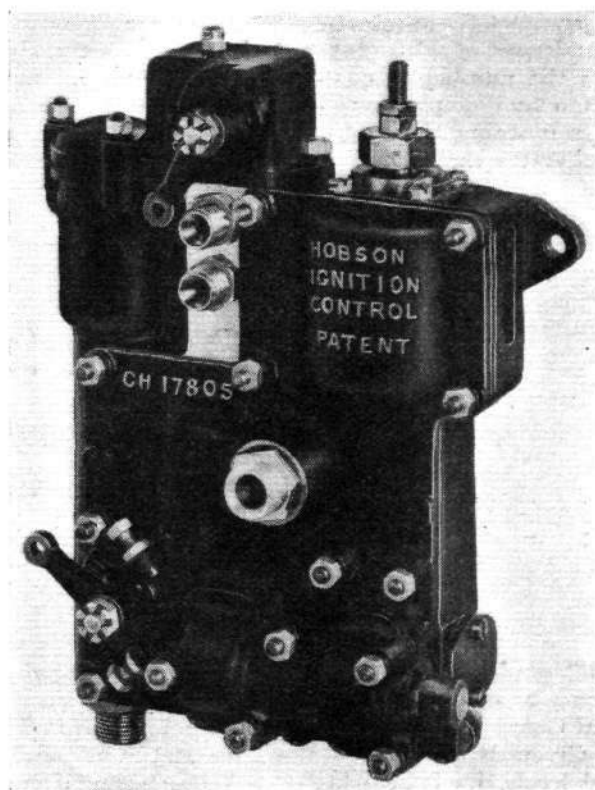


Fig. 12. The Hobson Automatic ignition control.

The device is intended to operate so as to retard the ignition for regular idling and starting without kick-back, when the throttle is more or less at the idling position. It should then rapidly advance the ignition to the maximum when cruising conditions are present. It should again somewhat retard the ignition for normal full-load running, and further retard it for take-off boost or when the emergency over-ride boost is in action.

It contains a device which prevents a continuous advancement of ignition timing as height is gained above the rated height, or alternatively reduces the rate of increment of advance as height is gained above the rated height. In addition, it can also be used to bring the power and rich-mixture jets into operation.

Carburation Heat Control

It is very desirable to give extra heat to the carburettor when cruising at less than normal boost, not only to prevent freezing, but also to secure more economical running. The ignition control can be used to govern the heat input to the carburation system in accordance with boost pressure, and to obtain this effect, it may operate

hot and cold air shutters in the air intake, or exhaust heating, steam heating, oil heating, etc., but there should be incorporated an over-ride operated by the pilot, so that during rain or snow sufficient heat input occurs to prevent freezing.

In conclusion, the following is a summary of the advantages of this automatic control scheme.

The devices that have been discussed are: (1) the Claudel-Hobson carburetter; (2) the Hobson-Induction pressure (boost) control; (3) the Hobson-Penn automatic mixture control for altitude; (4) the Hobson pilot's cockpit control; (5) on multi-engine machines, the Hobson automatic ignition control.

A properly arranged combination on a machine, of (1) (2), (3) and (4) gives the pilot the following advantages: Completely automatic, economical and reliable carburation; immediate and positive acceleration; increased power for take-off without damage to engine; induction pressure kept at its rated figure, irrespective of the throttle opening or engine speed; completely automatic altitude control; completely automatic ignition timing; only three set positions of altitude control lever. Lastly, by reducing the number of controls with their attendant complication and distraction, it gives the word "piloting" a truer meaning than hitherto.

It obviates the following possible contingencies or mis-

takes by the pilot: He cannot damage his engine if he puts his throttle lever to the fully open position when taking off; he cannot damage or strain his engine, whether near the ground or at altitude, by giving too high an induction-pipe pressure; after a long glide or dive, the engine cannot be opened up on a weak mixture: the pilot need not alter his altitude control lever with each change of altitude or throttle opening; he cannot damage his engine by running on a mixture too weak for maintained power. Economy at cruising speed is, however, still kept, and over-rich, wasteful mixtures are also impossible; when the over-ride on the boost control is operated, the rich mixture jet comes in first; watching a thermo-couple and boost gauge as a check on mixture strength and induction pipe pressure is unnecessary; if, in a grave emergency, the pilot requires maximum possible power below the engine's rated altitude, the throttle lever is put through a gate, the result of which is to break a seal. At the same time, a rich mixture jet comes into operation, thereby helping to minimise any possible damage. A log-book record of the broken seal should ensure the necessary engine examination.

In multi-engined machines the automatic ignition control obviates the undesirable complication of multiple controls between the cockpit and the engine housings, with their attendant difficulty of synchronisation.

CONTINUOUS BEAMS

The Graphical Solution of the Most General Problems

By J. HANSON, B.Sc., D.I.C.

(Continued from page 27)

Section 4. 2. Example

THE graphical procedure will be illustrated by reference to an example in which a beam CA is supported at C and A and an intermediate point B as in Fig. 1.

Given details of the elastic properties of the beam, its end loads, its lateral loads, and the terminal couples at C and A, the problem is to find the bending moment at B and, thereafter, the bending moments along the whole length of the beam. The two portions CB and BA of the continuous beam CA are shown separately in Figs. 2 and 9. These diagrams together with Figs. 3, 4, 10 and 11 give all the details of the elastic characteristics and loading system on the beam.

Section 4. 21. Evaluation of α_x for Bay CB

To evaluate the series (14a) for the bay CB the first step is to integrate the ω values of Fig. 2. In the example taken this is straightforward since ω is constant over certain lengths: when the ω variation gives a general curve the integration may be done directly by means of an integrator, or by dividing the area under the ω -curve into increments, and finding, by counting squares or by the mid-ordinate rule or by planimeter, the area of each increment. Having obtained to scale in one of these ways

the integral curve representing $\int_0^x \omega dx$ (Fig. 5), a further integration is performed to obtain $\int_0^x \int_0^x \omega (dx)^2$, which is marked [1] in Fig. 6, and is the first term in the α_x series. Its ordinates are given in column (2) of Table (1), where are also shown (column (3)) the corresponding ordinates of the η^2 curve of Fig. 4. Multiplying corresponding

ordinates of columns (2) and (3) together we obtain column (4) representing $\eta^2 \int_0^x \int_0^x \omega (dx)^2$. This curve is then integrated by any of the methods previously mentioned, the values being shown in column (5). Column (6) gives the values of the second integration, or

$$\int_0^x \int_0^x \eta^2 \int_0^x \int_0^x \omega (dx)^4,$$

which is the second term of the α_x series and when added to curve [1] of Fig. 6 gives curve [2], which is the second approximation to α_x . Multiplying corresponding ordinates of columns (3) and (7) together we obtain column (8) representing

$$\eta^2 \int_0^x \int_0^x \omega (dx)^2 + \eta^2 \int_0^x \int_0^x \eta^2 \int_0^x \int_0^x \omega (dx)^4$$

which when doubly integrated (columns (9) and (10)) gives

$$\int_0^x \int_0^x \eta^2 \int_0^x \int_0^x \omega (dx)^4 + \int_0^x \int_0^x \eta^2 \int_0^x \int_0^x \eta^2 \int_0^x \int_0^x \omega (dx)^6.$$

This when added to curve [1] gives curve [3] (column (11)) and is the first three terms of the α_x series and thus the third approximation.

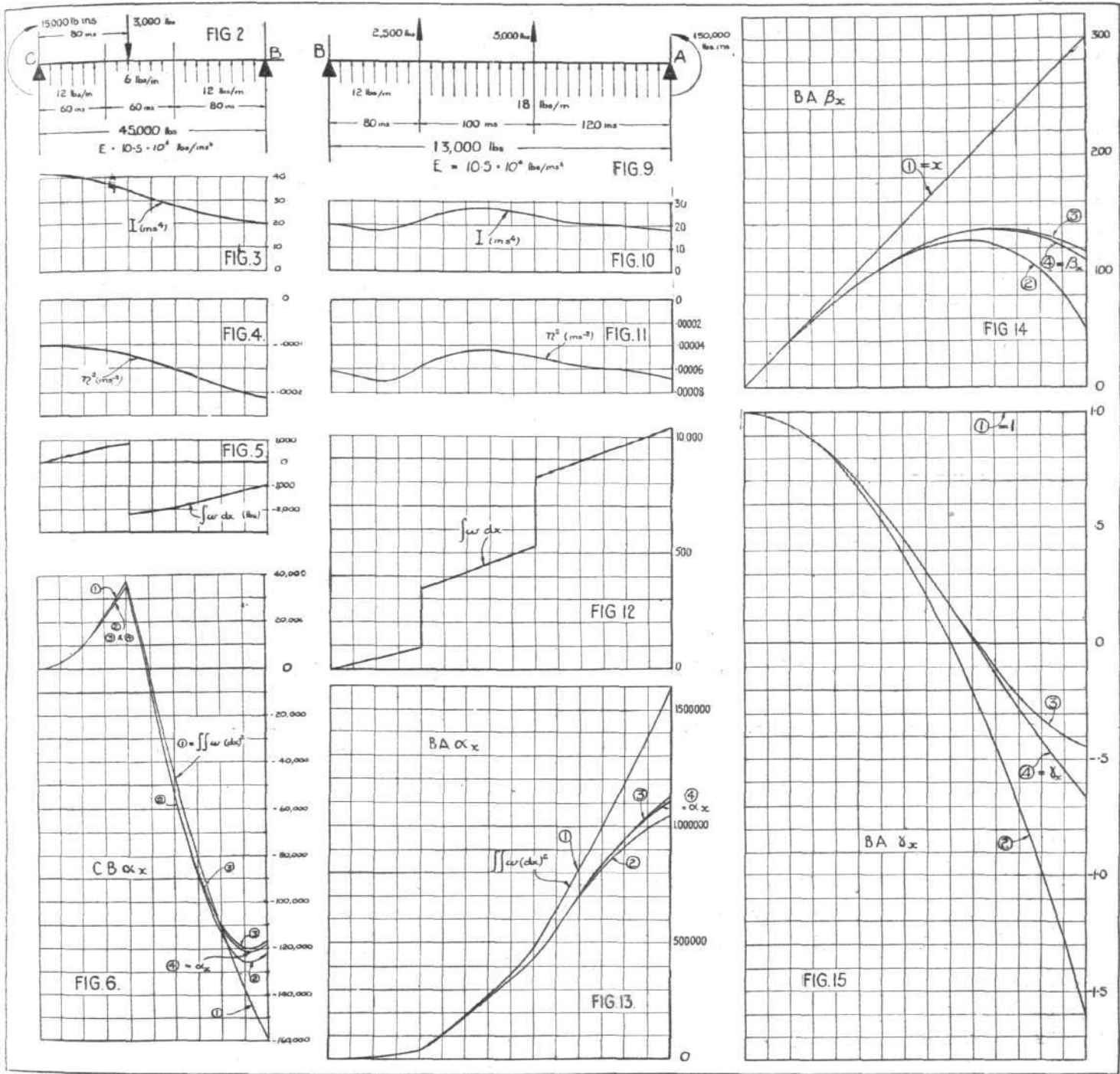
Continuing this process we obtain curve (4) of Fig. 6 (column (15)), which represents the first four terms of the α_x series.

It is seen that curve [4] differs only slightly from curve [3] so the process can be stopped and curve [4] taken as the final curve for α_x .

In all practical examples it is usually found that by taking four or five terms sufficient accuracy is obtained.

Section 4. 22. Evaluation of β_x for Bay CB

In the evaluation of the series (14b) for the bay CB the



first approximation is the simple relation $\beta_x = x$, which is given in curve [1] of Fig. 7 and column (1) of Table (2). The corresponding ordinates of the η^2 curve of Fig. 4 are given in column (2). Multiplying corresponding ordinates in columns (1) and (2) together we obtain column (3) representing $\eta^2 x$, which when doubly integrated (columns (4) and (5)) gives

$$\int_0^x \int_0^x \eta^2 x (dx)^2$$

which is the second term of the β_x series and when added to curve [1] of Fig. 7 gives curve [2], which is the second approximation to β_x . This is similarly multiplied by η^2 , doubly integrated and added to curve [1] and a similar procedure as for α_x follows; curve [3] and finally curve [4] = β_x being obtained.

Section 4. 23. Evaluation of γ_x for Bay CB

The evaluation of the series (14c) for the bay CB followed similarly to that for α_x and β_x , the first approximation in

this case being $\gamma_x = \tau$ (curve [1] of Fig. 8) and the second approximation

$$\gamma_x = \tau + \int_0^x \int_0^x \eta^2 (dx)^2$$

which is curve [2] of Fig. 8 and column (5) of Table (3). The final values being curve (4) of Fig. 8 and column (13) of Table (3).

Section 4. 24. Evaluation of α_x , β_x and γ_x for Bay AB

The evaluations of α_x , β_x and γ_x for the bay BA follow on exactly the same lines as for the bay CB and the results are shown in Figs. 12, 13, 14 and 15 the corresponding tables being omitted.

Section 4. 25. Solution of the Three Moment Equation

The values of α_x , β_x and γ_x having been obtained for both bays, we can now proceed to the Three Moment

Table (1) α_x Bay CB

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
x ins.	$\int_0^x \int_0^x \omega(dx)^2$	$\eta^2 \times 10^3$ (-ve)	$\eta^2 \int_0^x \int_0^x \omega(dx)^2$ (-ve)	$\int_0^x \eta^2 \int_0^x \omega(dx)^3$ (-ve)	$\int_0^x \int_0^x \eta^2 \int_0^x \omega(dx)$ (-ve)	[2]	$\eta^2 [2]$ (-ve)	$\int_0^x \eta^2 [2] dx$ (-ve)	$\int_0^x \int_0^x \eta^2 [2] (dx)^2$	[3]	$\eta^2 [3]$ (-ve)	$\int_0^x \eta^2 [3] dx$ (-ve)	$\int_0^x \int_0^x \eta^2 [3] (dx)^2$ (-ve)	[4]
0	0	.1020	0	0	0	0	0	0	0	0	0	0	0	0
20	2,400	.1045	.251	2.51	25.1	2,375	.248	2.48	24.8	2,375	.248	2.48	24.8	2,375
40	9,600	.1071	1.030	15.30	202.8	9,397	1.006	15.00	200.0	9,400	1.007	15.02	200.0	9,400
60	21,600	.1142	2.465	50.24	858.0	20,740	2.367	48.72	836.8	20,760	2.370	48.78	837.4	20,760
80	37,200	.1241	4.620	121.1	2,571	34,630	4.305	115.4	2,478	34,720	4.310	115.6	2,481	34,720
100	4,800	.1403	6.674	160.5	5,387	10,190	1.430	144.2	5,074	9,874	1.385	144.8	5,085	9,885
120	44,400	.1530	6.675	87.1	7,873	52,270	7.855	51.34	7,030	51,430	7.720	53.78	7,071	51,470
140	80,400	.1714	13.77	117.4	7,560	87,960	15.07	177.9	5,764	86,160	14.78	171.2	5,896	86,300
160	111,600	.1904	21.25	457.6	1,810	113,400	21.60	544.6	1,461	110,100	20.96	528.6	1,101	110,500
180	138,000	.2040	28.15	951.6	12,280	125,700	25.60	1,017	17,070	120,900	24.66	984.8	16,240	121,800
200	150,600	.2142	34.20	1,575	37,550	122,100	26.20	1,535	42,580	117,000	25.08	1,482	40,910	118,700

Table (2) β_x Bay CB

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
x (ins.)	$\eta^2 \times 10^3$ (-ve)	$\eta^2 \times 10^3$ x (-ve)	$\int_0^x \eta^2 x dx$ (-ve)	$\int_0^x \int_0^x \eta^2 x (dx)^2$ (-ve)	[2]	$\times 10^3$ $\eta^2 [2]$ (-ve)	$\int_0^x \eta^2 [2] dx$ (-ve)	$\int_0^x \int_0^x \eta^2 [2] (dx)^2$ (-ve)	[3]	$\times 10^3$ $\eta^2 [3]$ (-ve)	$\int_0^x \eta^2 [3] dx$ (-ve)	$\int_0^x \int_0^x \eta^2 [3] (dx)^2$ (-ve)	[4]
0	.1020	0	0	0	0	0	0	0	0	0	0	0	0
20	.1045	2.090	.0209	.2090	19.79	2.070	.0207	.2070	19.79	2.070	.0207	.2070	19.79
40	.1071	4.284	.0846	1.264	38.74	4.150	.0829	1.243	38.76	4.152	.0830	1.243	38.76
60	.1142	6.852	.1960	4.070	55.93	6.384	.1882	3.954	56.05	6.410	.1885	3.957	56.04
80	.1241	9.928	.3638	9.668	70.43	8.750	.3396	9.232	70.77	8.794	.3405	9.248	70.75
100	.1403	14.03	.6034	19.34	80.66	11.32	.5403	18.03	81.97	11.50	.5437	18.09	81.91
120	.1530	18.36	.9272	34.65	85.35	13.05	.7840	31.27	88.73	13.58	.7943	31.47	88.53
140	.1714	24.00	1.351	57.44	82.60	14.18	1.056	49.68	90.32	15.48	1.085	50.26	89.74
160	.1904	30.46	1.895	89.85	70.15	13.36	1.332	73.55	86.75	16.52	1.405	74.76	85.24
180	.2040	36.72	2.567	134.48	45.52	9.29	1.558	102.47	77.53	15.82	1.728	106.03	73.91
200	.2142	42.84	3.363	193.78	6.22	1.33	1.664	134.70	65.30	14.00	2.024	141.64	58.36

Table (3) γ_x Bay CB

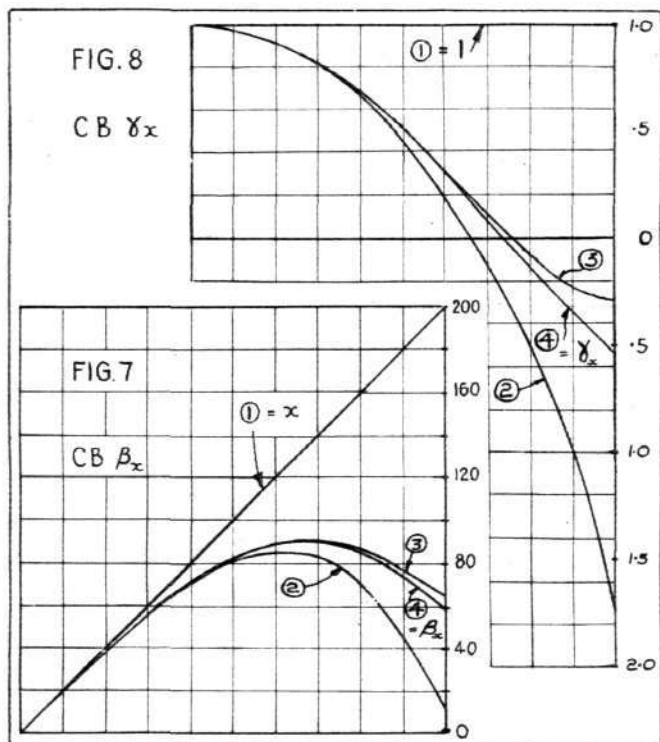
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
x (ins.)	$\eta^2 \times 10^3$ (-ve)	$\int_0^x \eta^2 dx$ (-ve)	$\int_0^x \eta^2 (dx)^2$ (-ve)	[2]	$\eta^2 [2] \times 10^3$ (-ve)	$\int_0^x \eta^2 [2] dx$ (-ve)	$\int_0^x \eta^2 [2] (dx)^2$ (-ve)	[3]	$\times 10^3$ $\eta^2 [3]$ (-ve)	$\int_0^x \eta^2 [3] dx$ (-ve)	$\int_0^x \eta^2 [3] (dx)^2$ (-ve)	[4]
0	.1020	0	0	1.000	.1020	0	0	1.000	.1020	0	0	1.000
20	.1045	2.065	.0207	.9793	.1023	2.045	.0204	.9796	.1023	2.045	.0204	.9796
40	.1071	4.184	.0832	.9168	.0984	4.048	.0813	.9187	.0985	4.050	.0813	.9187
60	.1142	6.398	.1890	.8110	.0927	5.958	.1813	.8187	.0936	5.970	.1815	.8185
80	.1241	8.780	.3408	.6592	.0819	7.704	.3179	.6821	.0847	7.752	.3187	.6813
100	.1403	11.42	.5428	.4572	.0641	9.164	.4866	.5134	.0720	9.318	.4894	.5106
120	.1530	14.34	.8001	.1999	.0305	10.11	.6797	.3207	.0480	10.52	.6878	.3122
140	.1714	17.60	1.1202	-.1202	-.0206	10.20	.8824	.1176	.0202	11.20	.9050	.0950
160	.1904	21.22	1.5083	-.5083	-.0967	9.028	1.0747	-.0747	-.0142	11.26	1.1296	-.1296
180	.2040	25.17	1.9722	-.9722	-.1982	6.080	1.2258	-.2258	-.0460	10.66	1.3488	-.3488
200	.2142	29.34	2.730	-.1730	-.3705	.394	1.2905	-.2905	-.0622	9.578	1.5512	-.5512

Table (4) Bay CB

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
x	I	a_r $\div 10^3$	$\frac{a_x}{I} \div 10^3$	$\int_0^x \frac{a_x}{I} dx \div 10^3$	$\int_0^x \int_0^x \frac{a_x (dx)^2}{I} \div 10^3$	β_x	$\frac{\beta_x}{I}$	$\int_0^x \frac{\beta_x}{I} dx$	$\int_0^x \int_0^x \frac{\beta_x (dx)^2}{I}$	γ_x	$\frac{\gamma_x}{I} \times 10$	$\int_0^x \frac{\gamma_x}{I} dx$	$\int_0^x \int_0^x \frac{\gamma_x (dx)^2}{I}$
0	42.0	0	0	0	0	0	0	0	0	1.000	.2380	0	0
20	41.0	2.375	.058	.580	5.800	19.79	.482	4.82	48.2	.9796	.2386	.4766	4.766
40	40.0	9.400	.235	3.500	46.40	38.76	.969	19.34	290.0	.9187	.2296	.9448	18.98
60	37.5	20.76	.554	11.38	195.2	56.04	1.494	43.96	922.8	.8185	.2182	1.393	42.35
80	34.5	34.72	1.006	26.98	578.8	70.75	2.059	79.40	2,156	.6813	.1976	1.808	74.36
100	30.5	-9.885	-.324	34.80	1,196	81.91	2.685	126.7	4,218	.5106	.1822	2.188	114.3
120	28.0	-51.47	-1.838	13.18	1,676	98.53	3.162	185.2	7,337	.3122	.1250	2.495	161.2
140	25.0	-86.30	-3.452	-39.72	1,411	89.74	3.590	252.7	11,720	.0950	.0880	2.658	212.7
160	22.5	-110.5	-4.905	-123.3	-219.2	85.24	3.788	326.5	17,510	-.1296	-.0575	2.639	265.7
180	21.0	-121.8	-5.800	-230.3	-3,755	73.91	3.520	399.6	24,770	-.3488	-.1601	2.415	316.2
200	20.0	-118.7	-5.930	-347.6	-9,534	58.36	2.918	464.0	33,400	-.5512	-.2756	1.974	360.1

Equation ((13)). Since the value of E has been assumed constant throughout the beam it can be eliminated from the equation.

Considering again bay CB, Table (4), column (3) gives the values of a_x and column (2) gives the corresponding values of I. Dividing column (3) by column (2) we obtain the values of $\frac{a_x}{I}$ which when integrated (column (5)) give $\int_0^x \frac{a_x}{I} dx$ and the value of this ordinate at $x = l$ is the first term on the left-hand side of equation [13] with the constant E value eliminated. Column (6) of Table (4) gives the integration of column (5) and the value of the ordinate at $x = l$ gives $\int_0^l \int_0^x \frac{a_x}{I} (dx)^2$ which, when divided by 1 corresponds to the second term on the left-hand side of the Three Moment Equation (13).



The remaining terms in square brackets on the left-hand side of equation (13) are obtained in a similar way, as is shown in Table (4).

The procedure indicated by the right-hand side of equation (13) for the bay BA is then performed, though it has not been thought necessary to include the corresponding table, the nature of the necessary calculations being sufficiently illustrated by the "left-hand side" Table (4)

All the terms required to determine M_B , and hence, the bending moment anywhere along CA, are now available. Collecting them, we have:—

BAY CB.

$$a_1 = -118,700 \quad \beta_1 = 58.36 \quad \gamma_1 = -.5512 \quad l = 200$$

$$\int_0^l \frac{a_x}{I} dx = -347,600 \quad \int_0^l \int_0^x \frac{a_x}{I} (dx)^2 = -9,534,000$$

$$\int_0^l \frac{\beta_x}{I} dx = 464.0 \quad \int_0^l \int_0^x \frac{\beta_x}{I} (dx)^2 = 33,400$$

$$\int_0^l \frac{\gamma_x}{I} dx = 1.974 \quad \int_0^l \int_0^x \frac{\gamma_x}{I} (dx)^2 = 360.1$$

$$M_c = 45,000$$

BAY BA.

$$a_1 = 1,116,000 \quad \beta_1 = 109.0 \quad \gamma_1 = -.6709 \quad l = 300$$

$$\int_0^l \frac{a_x}{I} dx = 5,737,000 \quad \int_0^l \int_0^x \frac{a_x}{I} (dx)^2 = 367,400,000$$

$$\int_0^l \frac{\beta_x}{I} dx = 1,317 \quad \int_0^l \int_0^x \frac{\beta_x}{I} (dx)^2 = 151,000$$

$$\int_0^l \frac{\gamma_x}{I} dx = 4.303 \quad \int_0^l \int_0^x \frac{\gamma_x}{I} (dx)^2 = 1,352$$

$$M_A = 150,000$$

Substitution in (13) leads to:—

$$[-347,600 + 47,670] + \frac{M_B + .5512 \times 45,000 + 118,700}{58.36} [464 - 167] + 45,000 [1.974 - 1.800] = [-1,224,000] + \frac{150,000 + .6709 M_B - 1,116,000}{109.0} [-503.3] + M_B [-4.507]$$

That is $12.70 M_B = 2,800,000$

$$\text{or } M_B = 220,500$$

Finally (as will be clear to those who have studied §3, from equations (7) and (8)) the bending moment at any point x in CB will be given by

$$\left[a_x + \frac{M_B - M_c \cdot \gamma_1 - a_1}{\beta_1} \beta_x + M_c \cdot \gamma_x \right]_{CB} \dots \dots (15a)$$

and at any point x in BA by

$$\left[a_x + \frac{M_A - M_B \cdot \gamma_1 - a_1}{\beta_1} \beta_x + M_B \cdot \gamma_x \right]_{BA} \dots \dots (15b)$$

TECHNICAL LITERATURE

SUMMARIES OF AERONAUTICAL RESEARCH COMMITTEE REPORTS

REPORTS published by His Majesty's Stationery Office, London, which may be purchased directly from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, W.C.2; 120, George Street, Edinburgh; York Street, Manchester 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square West, Belfast; or through any ordinary bookseller.

ON STRESS AND STIFFNESS DETERMINATION IN CERTAIN CANTILEVER WINGS IN WHICH THE RESISTANCE TO TWISTING IS APPRECIABLY DEPENDENT ON TORSIONAL SHEAR STRESSES. By H. Roxbee Cox, Ph.D., D.I.C., B.Sc., J. Hanson, B.Sc., D.I.C., and W. T. Sandford, R. & M. No. 1617. (17 pages and 8 diagrams.) May, 1934. Price 1s. net.

Methods of designing modern cantilever wings are such that the existing conventional methods of stress determination are frequently inapplicable. Considerations of general design economy, as well as the prevention of flutter, loss of lateral control, and wing structural instability have led to wing constructions in which twisting moments are resisted by torsional shear stresses as well as by spar bending stresses. So, spars are found that are individually capable of efficiently resisting torsion as well as bending; in addition, or alternatively, we find the wing covering capable of resisting shearing actions, though generally incapable of appreciably contributing to the bending stiffness of the wing. This deliberate resistance to twisting by shear stresses in the structural material creates problems in stress and stiffness determination to the solutions of which this paper is a contribution.

The report leads to solutions of the strength and stiffness problem which are applicable to a number of actual wings, and for those wings the partition of the applied torque between the "differential bending" and "tube" elements of the structure is discussed.

ARITHMETICAL SOLUTION OF EQUATIONS OF THE TYPE $\Delta^4 \psi = \text{CONST.}$ By A. Thom, D.Sc., Ph.D. R. & M., No. 1604. (11 pages and 12 diagrams.) March 4, 1933. Price 9d. net.

It has already been shown* that in using the "interpolation" method of solution of the equation $\nabla^2 \psi = f(x, y)$, the value at the centre of a square of side $2n$ can be calculated from a simple formula to a considerable accuracy. Other calculations enable an estimation of the value of ψ to be made at the centre of four squares. A similar type of analysis is here developed for the solution of the equation of fourth order.

* "An Investigation of Fluid Flow in Two Dimensions," A. Thom. R. & M. No. 1194.

"The Flow Past Cylinders at Low Speeds," A. Thom, Proc. Roy. Soc., Vol. 141, 1933.

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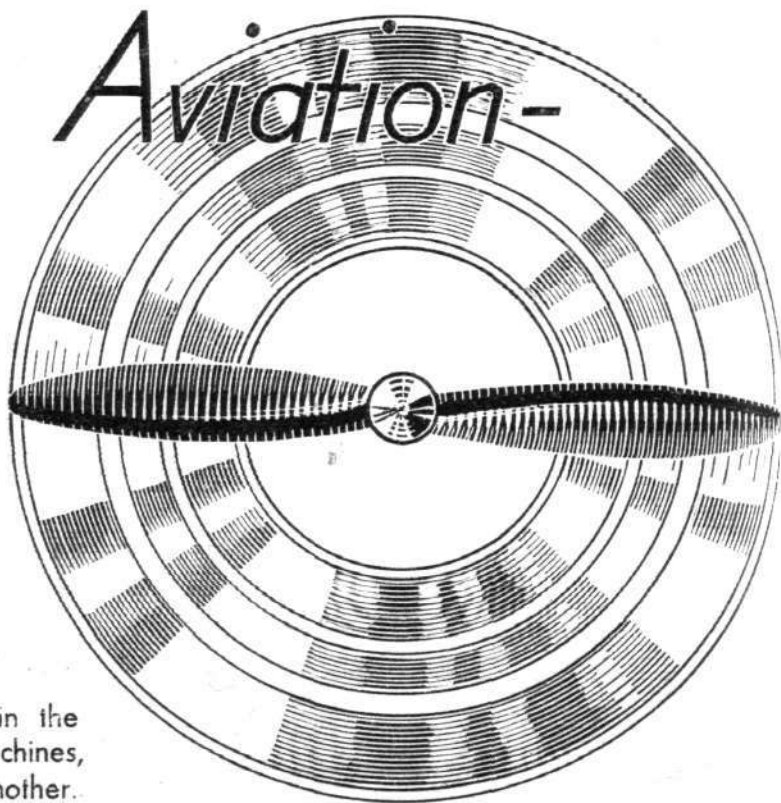
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PRIVATE FLYING

LORD SEMPILL, HOME FROM HIS TOUR, REVIEWS FURTHER ASPECTS OF FLYING IN THE COMMONWEALTH

CERTAIN changes in the conditions affecting the granting of pilots' licences in the various categories in the Australian Commonwealth have been brought about recently which may be worth referring to. Holders of the pilot's "A" licence wishing to carry passengers have to conform to the following requirements: Candidates must now take an advanced training course, and further qualify by carrying out a cross-country flight of not less than fifty miles, and in addition show that they have flown at least twenty-five hours solo. Previously the pilot was granted the necessary permission if he could prove that he had completed forty hours solo, but it was found in many cases that permits had been granted to those who had received no advanced training since taking their original "A" licences, and it was thought desirable to make the additional training course compulsory.

"B" licences were, until recently, granted without the necessity for undergoing night-flying tests. Training facilities having improved, candidates are now required to qualify in both night and instrument flying. Flying instructors, who must be the holders of "B" licences, had previously to undergo an annual test. The regulations have now been revised, and the instructor must renew his permit every six months. It is not, however, necessary for him to subject himself for test if he can show that during the previous half year he has done forty hours' instructional flying and trained at least two pupils *ab initio* for their "A" licence.

Before obtaining an instructor's certificate a "B" licence pilot must now prove that he has flown 300 hours solo, whereas previously the minimum flying time was only 200 hours.

Licence Statistics

ON December 31, 1934, the current licences showed a general increase over the previous year, except in the case of flying instructors. On the date mentioned there were 469 holders of "A" licences, 239 "B" and 39 instructors' permits. There was a marked increase in the number of ground engineers' licences during the year, the total according to the latest return standing at 323. The number of licensed aerodromes also increased during the year, the total for Australia and New Guinea being 140. The prepared Government aerodromes and emergency landing grounds on the same date totalled 217. The number of aircraft registered and the current certificates of airworthiness were also in excess of the previous year, being 224 and 205 respectively.

The question of aerodrome selection in Australia presents problems non-existent in this country, where one standard of requirements may be laid down for general purposes. The minimum size recommended here by the Air Ministry of 600 x 600 yards might be perfectly satisfactory for aircraft in certain parts of Australia, but in the north, where the high average temperature makes for faster landings and longer take-offs, such an area might prove entirely inadequate. No standard regulations can, therefore, be applied to the continent as a whole.

From foregoing notes it will be gathered that although on the whole Australia is a fine country for flying, many

Australia: A Summing-up

extreme conditions, such as do not exist here, are met with in different parts. At certain seasons turbulent atmospheric conditions and the prevalence of dust storms are a great hindrance to aerial navigation. In some districts this dust trouble is intensified where, on virgin tracts over large areas, the soil tends to become lacking in substance, resulting in a top layer of powdered earth which is carried into the atmosphere by the high winds which prevail at certain periods.

The excessive heat in some parts of the Commonwealth presents certain problems which those manufacturers of aircraft who look to Australia as a potential market would do well to bear in mind. Troubles with petrol installations have been met with, and might have been avoided if designers had thoroughly appreciated the conditions. The heat generated by the intensity of the direct rays of the sun, coupled with radiation from the overheated ground, tend to produce vapour locks in the fuel system, which should be protected as much as possible from the effect of these adverse circumstances. British constructors should study conditions closely if they desire to obtain an outlet for their products in the Commonwealth. Aircraft of wooden construction have proved more satisfactory than might have been supposed, and, if properly protected and maintained, give good service for many years.

High-wing Advantages

I SAW many machines so constructed which were serviceable after ten years of constant use. Particular attention should, however, be given to the fabric covering, which must be adequately protected from the actinic rays of the sun. In the more tropical temperatures which prevail in a large part of Australia the high-wing monoplane may have advantages, as the cabin is kept cooler in this type; it is also more suitable for use in rough country, where the wings will clear scrub which would foul a low-wing machine or biplane. A certain amount of flying, incidentally, has been done on the Autogiro, and there is undoubtedly a future for this type in Australia.

Distances are very great and the private owner needs machines of greater speed and endurance than would be necessary in a smaller country.

Gliding and Soaring

GLIDING and soaring have made slow progress in Australia, although there are a number of enthusiasts. Efforts have been made from time to time to induce the Government to lend financial aid to encourage motorless flight on the grounds of its value as a possible means of training future Air Force pilots. Although the authorities do not seem to have been over-impressed with its possibilities in this respect, the Commonwealth Government decided in 1933 to allocate the sum of £600 to be expended in annual grants to qualified clubs. The subsidy took the form of a quarterly grant for each type of machine maintained in airworthy and serviceable condition, as follows: £5 per quarter for each primary glider; £7 10s. for secondary gliders, and £10 per quarter for sailplanes. The clubs were, in the first instance, slow to qualify, with the result that the sum allocated was not expended during the first year, and the Government decided to extend the period of assistance to December, 1935.

Private Flying**FROM THE CLUBS***Events and Activity at the Clubs and Schools***REDHILL**

High winds reduced flying hours last week at Redhill, the total being 53 hr. 20 min. Mr. A. W. Saunders made a first solo and Mr. G. L. McLannahan made his "B" licence night flight.

LIVERPOOL

During the week ended May 23, 64 hr. 25 min. were flown by the Liverpool and District Aero Club despite heavy rain and high winds on the Sunday. Cross-country flights were made to Reading, Castle Bromwich, and Doncaster.

TOLLERTON

The flying time totalled 23 hr. 35 min. at Tollerton last week. Strong winds made flying impossible for three days. One new flying member and two associate members have joined. Cross-country flights were made to Hatfield, Heston, Brough, and Birmingham, and thirty-eight machines visited the aerodrome.

WALSALL

After overcoming numerous difficulties, enthusiastic members of the now defunct Walsall Aero Club have formed the South Staffs Aero Club under the presidency of the Earl of Marrowby. Members have subscribed the capital, the club-house is now open, and an instructor has already taken up his duties with an Avro "Avian." The flying rates are: Dual, 45s. per hour; and solo, 30s. per hour.

YORKSHIRE

A total of thirty-four hours on Club machines was recorded last week. The Aviation Group now has a total membership of forty-five, of whom twenty-seven are flying. A huge crowd, numbering, at an estimate, over 3,000 persons, visited Yeadon Aerodrome on Empire Air Day, when special displays were arranged. A flight of three R.A.F. machines flew over from Catterick, and another flight from Thornaby landed at Yeadon during the afternoon.

SOUTHERN

Club machines flew seventeen hours during the week ended May 25. Four new members, Messrs. Hervey, Forte, Turner, and Miss Broad, joined; the latter is training for G.E. licences. Membership now totals 101.

Bad weather conditions accounted for a poor attendance on Empire Air Day. The Club ran several events for the benefit of the general public, who were admitted free of charge and invited to ask questions.

LONDON AEROPLANE CLUB

J. R. Ayling, who will be remembered for his long-distance flight with Mr. Reid in a "Dragon" last year, has joined the London Aeroplane Club as instructor.

The flying time for last week was 54 hr. 40 min., and Messrs. A. I. Sladen, R. Ott, R. L. Porteous, W. B. Feeny, and J. K. Mayo joined the club. Owing to the high winds, many members wishing to make their first solos and to carry out their "A" licence tests have been disappointed.

WITNEY AND OXFORD

A gale blew during almost the entire week before May 26 and this prevented any serious flying at the Witney and Oxford Aero Club. Three new members joined—B. Burletson and A. P. Noble, both of Oxford, and Captain H. S. Ford. Mr. G. W. R. Shaw, a pupil of Universal Aircraft Services, obtained his "A" and "C" licences.

The Garden Party arrangements are well in hand for June 8, and all visitors, especially those by air, will be welcome.

HERTS AND ESSEX

Flying has been very badly handicapped by the strong north-easterly winds that have prevailed during the past week, but, despite this, the flying time totalled 60 hr. 15 min. Four new members joined—Messrs. F. Bouchard, J. Hawker, H. A. Job, and T. E. Mitchell.

The next competition will be held on Sunday, June 2, and will be for the Wrighton Challenge Cup. It will take the form of a triangular cross-country with an undisclosed point on the last course that has to be discovered and bombed.

Mr. T. J. Rees, who recently completed his "B" licence tests, has now joined the staff of Imperial Airways.

HATFIELD

Members are asked to make early application for tickets for the Garden Party on June 8.

Major E. L. Gower, F/O. J. M. Wells, and Capt. D. J. Stewart have become members of the Royal Air Force Flying Club.

LANCASHIRE

Mr. "Johnnie" Hooson, who took his "B" licence recently, has left Woodford to join the Giroux Aviation Company at Southport. Mr. E. Palmer, of United Airways, completed a full blind flying course in the record time of four days, and Messrs. J. H. Millar and C. S. Robinson have qualified for the Club's long cross-country list.

Mr. Eustace Thomas, the oldest flying member—he is sixty-six—carried out an exemplary first solo on Jubilee Day.

MIDLAND

During the week ended May 23, 13 hr. 45 min. dual and 7 hr. 45 min. solo flying was done.

H.R.H. the Prince of Wales visited Castle Bromwich last week in his "Rapide," and among the normal run of visitors were Mr. W. Coates, of Crilly Airways, and Mr. Midgley, of Maddox Airways.

One cross-country was made to the Leicester Airport.

NORFOLK AND NORWICH

As the R.A.F. Stations at Martlesham and Bircham Newton were staging big displays for the public on Empire Air Day, the club did not attempt to rival their programmes, but confined its efforts to giving joy-rides. With the co-operation of the Air League, the first hundred flights were given at half rates to those who had never been up before.

A number of applications have been received for the Public Schools Aviation Camp, which will be held in August.

Miss V. Holmes has joined the club as a flying member.

CAMBRIDGE

High winds again reduced flying time at Marshall's Flying School last week to 24 hr. 55 min.

On Sunday eight members of the Civil Air Service Corps attended the aerodrome but were unable to fly at all owing to storms, which persisted from lunch time onwards. Two members, however, came along again on Monday, and one of them, Mr. S. A. Dew, carried out his first solo.

Five more members joined the club during the week, and both Mr. Runciman and Mr. Sleight completed their "A" licence tests.

HANWORTH

Flying time for last week totalled 35 hr. 30 min., and two new members joined.

Hanworth aerodrome was open to the public on Empire Air Day, the attendance recorded being far in excess of last year's figures.

Strong and gusty northerly winds have interfered with the normal Autogiro School flying, and only 18 hr. 40 min. were possible during last week. New pupils joined, Capt. Briand and Curicque, both of the French Air Force, for intensive courses. Lt. Cdr. Carace, of the Italian Air Force, made his first Autogiro solo.

CINQUE PORTS

The programme arranged for Empire Air Day at Lympne attracted some two hundred visitors, and although the elements did their best to hamper aviation's "at home" day, everything went according to schedule, and the visitors appeared to enjoy themselves. A strong wind and driving rain prevailed in the morning, but towards the afternoon the outlook became more cheerful.

The Club formation took off in the morning and made a propaganda flight over Folkestone and Hythe, and they were joined by the whole of the No. 25 Fighter Squadron from Hawkinge. In the afternoon the instructors gave displays of aerobatics and so forth, and a flight from Hawkinge carried out a display of formation aerobatics.

The weather was again the cause for keeping flying hours at their lowest, and last week only 32 hr. 45 min. were registered.

Two new members are Miss Helen Lynden-Bell and Mr. Dan Swindon. Another "A" licence aspirant is Mr. C. R. Hodgson.

Private Flying**BROOKLANDS**

As usual, the number of flying hours last week exceeded 100. Messrs. Garland, Gravely and Whitehurst obtained "A" licences; Messrs. Atwell, Aga, and Pocock have been taking blind flying instruction; and new members include Miss Sainsbury and Messrs. Bruce and Davis. A successful Tea Dance was held at the club last Sunday.

BRISTOL

Members of the Bristol and Wessex Aeroplane Club turned up in force on Empire Air Day, and the machines were fully booked from 11 a.m. until dusk providing joy-rides for members' friends. Others organised conducted tours over Bristol Airport for the benefit of the public, one of the chief attractions being the workshops of the Bristol Branch of Airwork, Ltd. Aerobatic displays were given by Mr. E. M. H. Slade, the club's chief instructor, despite rain and high wind.

Hanworth Club Re-opening

Next Sunday the Hanworth Country Club will be re-opened by the Rt. Hon. F. E. Guest. A luncheon will be given by the directors and a programme of events will start at 3 p.m. This programme includes two handicap races, a "Concours d'Elegance," and a series of demonstrations.

For Photographic Enthusiasts

This season's flying events provide unusually good opportunities for the amateur photographer. No enthusiastic amateur can afford to miss this week's issue (Wednesday, May 29) of *The Amateur Photographer*. It is a greatly enlarged issue of the utmost value to beginners and experienced photographers alike, and contains a wealth of instructive advice on every phase of photography as it affects the amateur user of a camera.

Brooklands Next Saturday

The Brooklands Garden Party will be held next Saturday. A very large number of types of civil aircraft will be demonstrated, and there will be displays by Hawkers and Vickers. Admittance will be by invitation only, but private owners are welcome provided they arrive by air before 2 p.m. Visitors arriving by air are particularly requested to taxi straight to the private owners' park at the south end of the aerodrome as soon as they arrive, and to park where requested by the officials. Machines can leave at any time after the display is over at approximately 5 p.m., but pilots are requested to taxi out to

READING

The "Gerald Royle" aeroplane will be officially handed over to the members next Sunday at 3 p.m. It will be remembered that the fund towards this machine was most generously started by Mr. and Mrs. George Royle in memory of their son Gerald Royle. Since then members have subscribed £115 and Viscount Wakefield the balance of £95. Messrs. Phillips and Powis also generously helped the purchase of the machine—a "Cirrus Hawk"—by agreeing to sell the machine at a substantially reduced rate.

Those who subscribed to the fund will be entitled to fly the machine at the rate of 30s. per hour, and future members and those who have not already contributed to the fund will be permitted to fly the machine at the same rate on a donation of £5.

It is hoped that the Club's president, the Rt. Hon. Lord Apsley, D.S.O., M.P., will perform the ceremony.

the chequered starting flag and to wait for the control lamp before taking off.

Spanish Air Tourists in England

A party of Spanish air tourists will be flying to England next month, and the Air Touring and Hospitality Committee of the Royal Aero Club is arranging for them to be entertained to a dinner on Tuesday, June 18. Any private owners wishing to attend and to assist in this hospitality are invited to communicate with the Secretary, Royal Aero Club, 119, Piccadilly, W.1, not later than June 10. Full details as to time and place of the dinner will be announced later.

The Grosvenor Cup Race

The race for the Grosvenor Cup will be flown on Saturday, July 13, the date on which the Leicester City Municipal Aerodrome will be officially opened. The race will start from and finish at the Leicester Airport, and the course will consist of two triangular laps of 21 miles.

In addition to the Grosvenor Cup, there will be cash prizes of £40, £20, and £10 for 1st, 2nd, and 3rd places, and also a special prize for the fastest time.

Entry forms and full particulars may be obtained from the Leicestershire Aero Club, Ltd., Municipal Aerodrome, Leicester, and the list closes on Saturday, June 29.

Private owners, incidentally, will be warmly welcomed at the opening ceremony, and all visiting pilots will be entertained by the Mayor of Leicester and by Mr. Lindsay Everard, M.P.

ACROSS the SOUTH ATLANTIC**Achievement by Spanish Pilot of a B.A. "Eagle"**

A NOTABLE achievement by a British light aeroplane was brought to a successful conclusion on Tuesday of last week when Señor Juan Pombo arrived at Natal, in Brazil, after flying across the South Atlantic in his B.A. "Eagle" (130 h.p. "Gipsy Major" engine). The 2,000-mile ocean crossing was part of a 9,000-mile flight from Santander, Spain, to Mexico City.

Flying solo, Señor Pombo took off from Bathurst, British West Africa, without difficulty after a run of 700 yards, although the machine had sufficient fuel on board, in special tanks in the cabin, for a range of 2,600 miles. After two

hours' flying he encountered storms which lasted for four hours, and after ten hours met side and head winds varying in strength from 12 to 32 m.p.h. In spite of these adverse conditions he arrived at Natal, 2,000 miles from his jumping-off point, after 16 hr. 42 min. flying. The equipment of the machine included Lodge plugs.

Later, taking off from Natal for Mexico City, a wheel sank into soft ground and the machine nosed over; the pilot was unhurt.

Señor Pombo, who is only twenty-one years old, has been flying since the age of fifteen.



Señor Pombo and the B.A. "Eagle" Santander, on which he made a 2,000-mile crossing of the South Atlantic in 16 hrs. 42 mins.—an average speed of 121 m.p.h. (Flight photographs.)

EXPANSION of the ROYAL AIR FORCE

*The Scheme in Full : How Aircraft Deliveries Will be Speeded-up :
The Problem of Personnel : Parliamentary Discussions*



AT THE HEAD OF AFFAIRS : A distinguished group photographed at a London meeting last week at which certain details of the expansion scheme were made public. Left to right : Air Marshal Sir Hugh Dowding, Air Member for Research and Development ; Sir Philip Sassoon, Under-Secretary of State for Air ; Lord Londonderry, Secretary of State for Air ; Air Chief Marshal Sir Edward Ellington, Chief of Air Staff ; and Air Vice-Marshal F. W. Bowhill, Air Member for Personnel.

BY March 31, 1937—that is, at the end of the next financial year—the strength of the Royal Air Force based at home, irrespective of the Fleet Air Arm, will be 1,500 first-line machines. This compares with an actual first-line figure of 580 machines at the present day, excluding the Fleet Air Arm, and with a total of 840 which we should have reached by the same date under the programme of expansion announced last July and provided for in the current Air Estimates. In short, we are nearly trebling the present strength of the Royal Air Force at home to-day.

These words, from Lord Londonderry's speech in the House of Lords on Wednesday of last week, adequately sum up the new Royal Air Force expansion scheme, which is now being put into effect with the utmost despatch.

In order to review details, it is advisable to deal with the plans under three separate headings: (a) aircraft, (b) personnel, and (c) aerodromes.

As regards (a), it is not possible at present to announce the numbers of fighter squadrons and bomber squadrons which will be formed, but it may be stated that the number of fighter squadrons depends upon the extent of the areas to be defended, whereas the number of bomber squadrons depends chiefly upon the strength of a potential enemy. In addition, a certain number of sea reconnaissance squadrons will be required, and will be equipped with both landplanes and seaplanes.

It is intended to form three new Auxiliary light bomber squadrons, but no new special reserve squadrons.

Speeding-up Deliveries

The matter of aircraft supply is an interesting one, more especially as the long-standing question of delay in putting new types into service has at last been brought to a head.

The production of the necessary numbers of machines is considered to be within the capacity of the industry without reorganisation. Lord Weir, whose work in a similar capacity during the War will be well remembered, is to act as adviser to the Air Ministry in regard to the major problems of production.

In the matter of the delay between issue of an Air Ministry specification and the distribution of the accepted types to squadrons, it is admitted that the existing system must now be radically altered.

These, in brief, are the proposed changes by which it is hoped to halve the present delivery period.

In the first place, it is intended to issue to the industry a rough draft of a specification a month or two in advance of the specification itself; this will give designers something upon which to make a start.

Secondly, specifications will not be nearly so detailed, and it is intended to give firms a much freer hand; the means by which the requirements are fulfilled will largely be left to them.

Thirdly, the acceptance of any advice given by the Ministry at the "mock-up conference" will be optional—constructors will not be pressed to accept it.

In the fourth place, the time of the Martlesham tests of a prototype will be considerably curtailed; certain non-essential tests will be carried out after the type has gone into service.

In the fifth place, the time of Service trials will be cut down. Lastly, the single "development squadron" system at present in vogue will be discontinued; on a type becoming ready for delivery, it will at once go to a number of squadrons.

Apart from these main features, time is to be saved wherever possible throughout the system.

It is understood that, while no extensive new sub-contracting is to be done as regards aircraft, it is just possible that engine manufacturers may be called upon to produce engines not of their own design.

Next we come to the question of personnel, the intake of which will, naturally, be on a very large scale—how large can best be shown by a comparison. In recent financial years the rate of intake was as follows:—

	Pilots. Aircraftmen, etc.	
1932-3	330	1,070
1933-4	300	1,600
1934-5	420	3,700

Under the expansion scheme the numbers required in the present and next years will be:—

Tradesmen and Pilots. unskilled men.	
2,500	20,000

The strength of the Royal Air Force at present is 32,000, including 2,700 pilots.

Lord Londonderry has made a special appeal for recruits, and it is confidently hoped that young men of the type and attainments required will respond in large numbers. Full details of the requirements will be found on page 598.

Lastly, there is the matter of stations and schools. Thirty-one new stations of one kind or another will have

South Atlantic Crossing

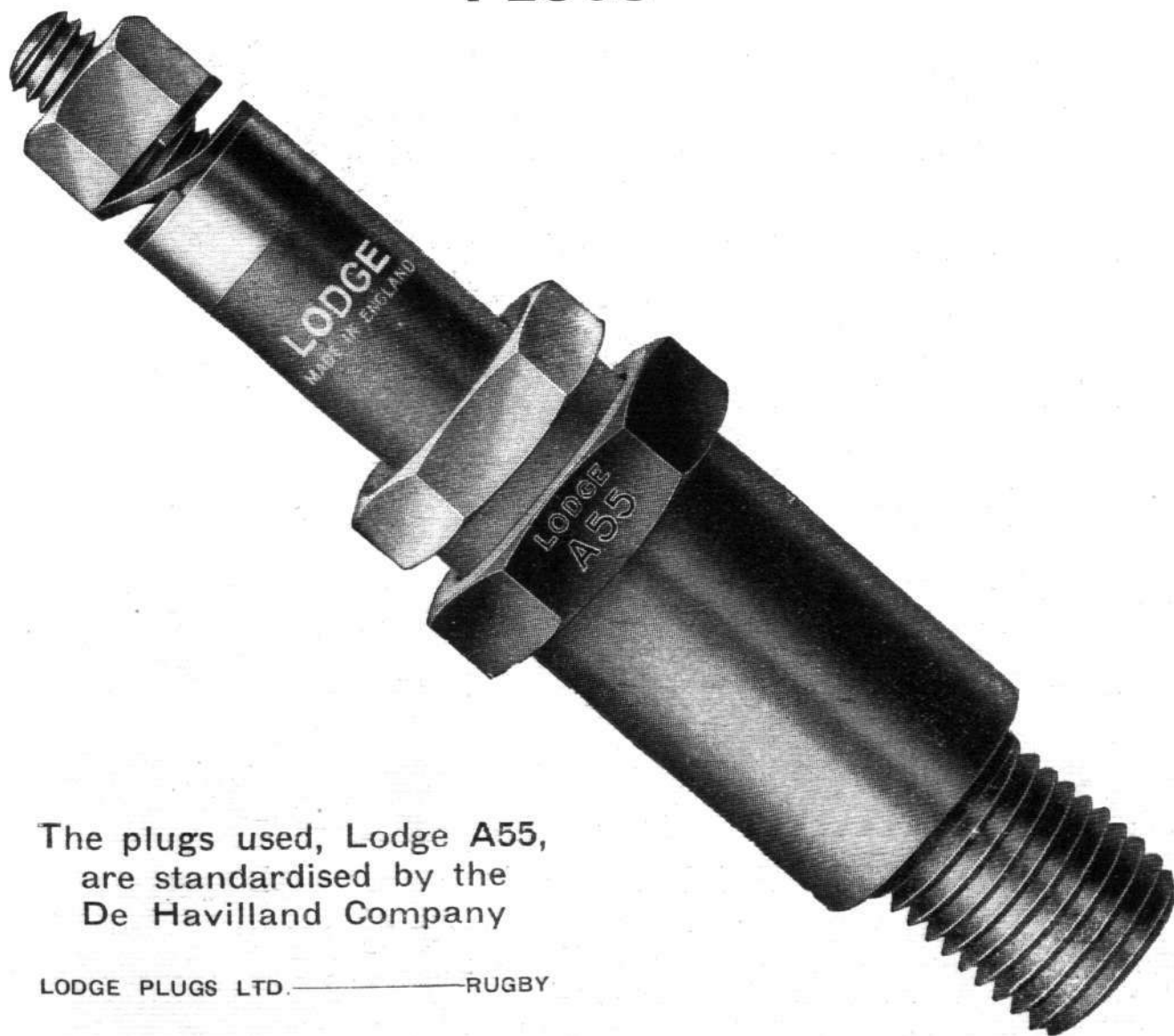
Senor Juan Pombo

B.A. "Eagle"

D.H. "Gipsy Major"

LODGE

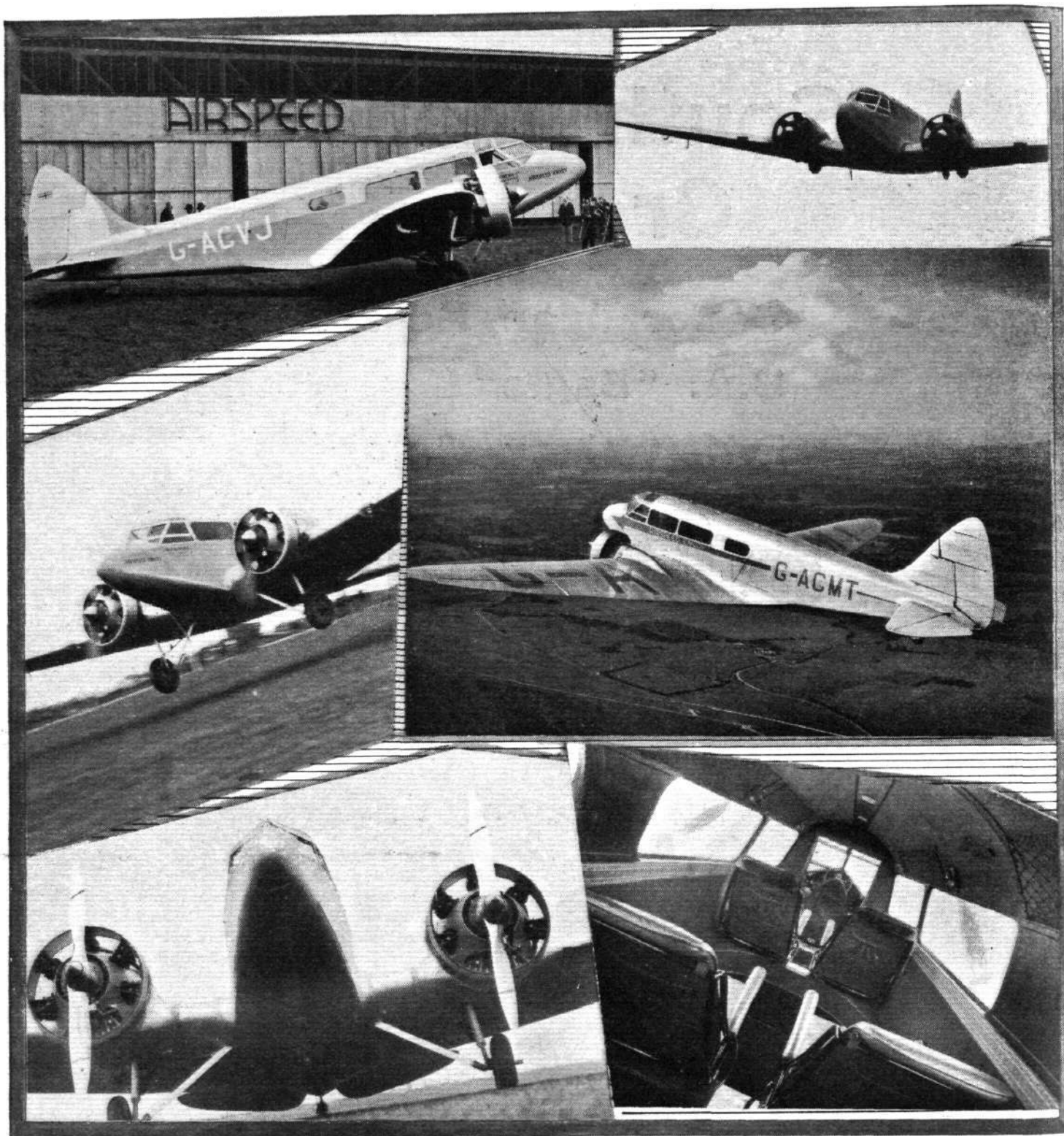
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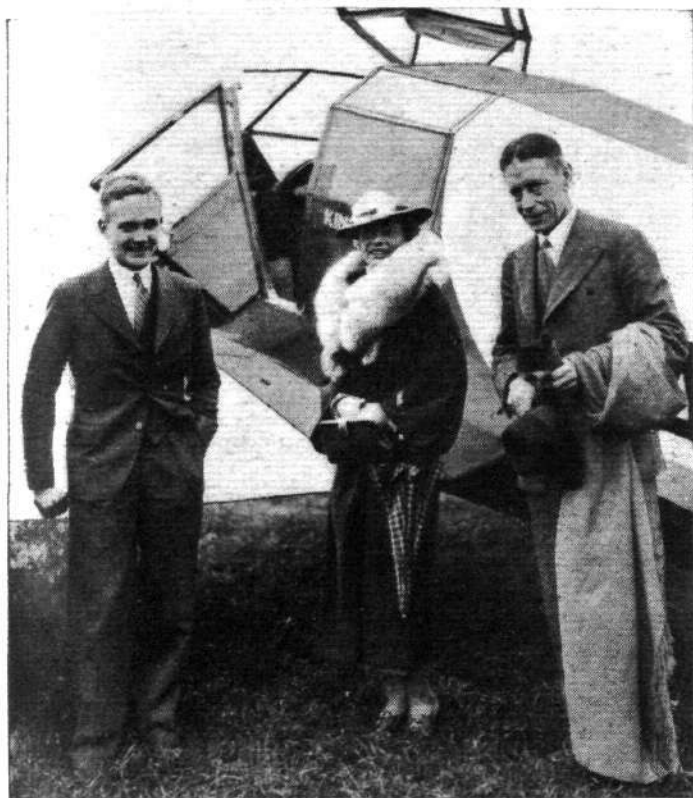
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IN PARLIAMENT



ON EMPIRE AIR DAY: Air Comdre. Chamier, Secretary-General of the Air League of the British Empire, about to make a tour of the aerodromes, accompanied by Mrs. Chamier. Their pilot, also seen in the photograph, was Mr. Seth Smith. A report of the day's events appears on pages 580-584.

to be provided over and above those already required under the existing expansion scheme. Of these, over half will be operational, and the remainder will be for training establishments and maintenance units.

Pending completion of new permanent aerodromes, the fullest use will be made of existing Service aerodromes and also of civil aerodromes.

Aerodromes will be so sited as to accord with a definite strategic plan. Fighter stations are to be located in the most convenient positions in relation to the areas to be defended, while bomber stations will be so placed as to facilitate the work of their aircraft while causing the minimum interference with the defensive organisation of fighter aircraft, guns and lights.

Since its formation the Aerodrome Board has inspected 318 sites, covering thirty-one counties. In addition to the sites already selected for the previous expansion scheme, thirteen have been provisionally marked down for the further expansion now proposed.

Five new flying training schools, in addition to the five already existing, will be required. It is expected that they will come into operation between October and March. A decision has already been taken in connection with the existing expansion scheme substantially to increase the present number of four civil flying training schools. Two additional schools will open in June, and a further two later in the year. Action has already been initiated further to increase the number.

Incidentally, the Air Ministry is understood to have given careful consideration to the suggestions that have been made in various quarters to the effect that the newly constructed Service aerodromes should have underground hangars. It is felt that, apart from the heavy cost, the results of such a scheme would not be commensurate with the effort involved. Generally speaking, dispersion is regarded as a better means of protection than overhead cover. There are, of course, definite advantages in providing underground facilities for the storage of fuel and explosives, and this system will be adopted where possible.

IN the House of Lords the Government's new air defence policy was explained by the Secretary of State for Air on May 22, following a speech by Lord Lloyd, who called attention to the situation in regard to Imperial defence.

Lord Lloyd said his motion was intended to voice in some measure the grave and growing anxiety of the country in regard to the inadequacy of our naval, military and air defences. There had been a growing sense of insecurity in the country. Whereas in 1929 we were definitely in a position to maintain our interests against any armed attack, we were to-day drifting into a position of dangerous inferiority. He would be surprised if the Secretary of State for Air were to assert that we were still in a position of equality with the strongest air power within range. The Germans, to say nothing of the French, were definitely ahead of us, and the country was entitled to know how so grave a position had been allowed to come about. Over and over again during the past few years the Government had been warned but had refused to listen. The real danger was from night-bombing of our large towns and industrial cities on a big scale.

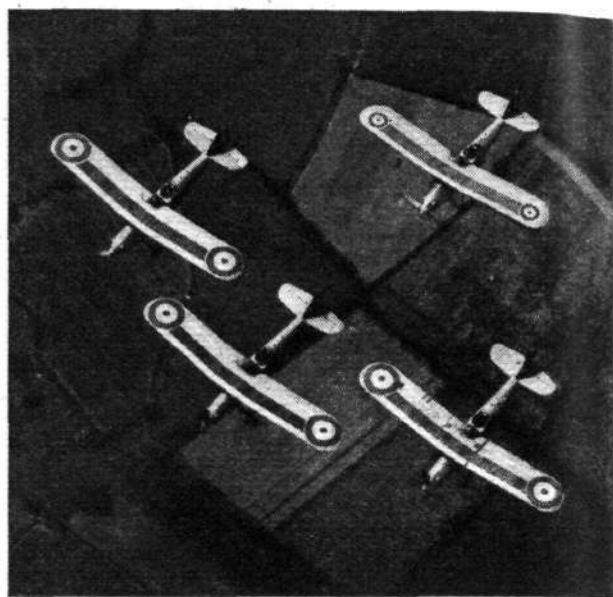
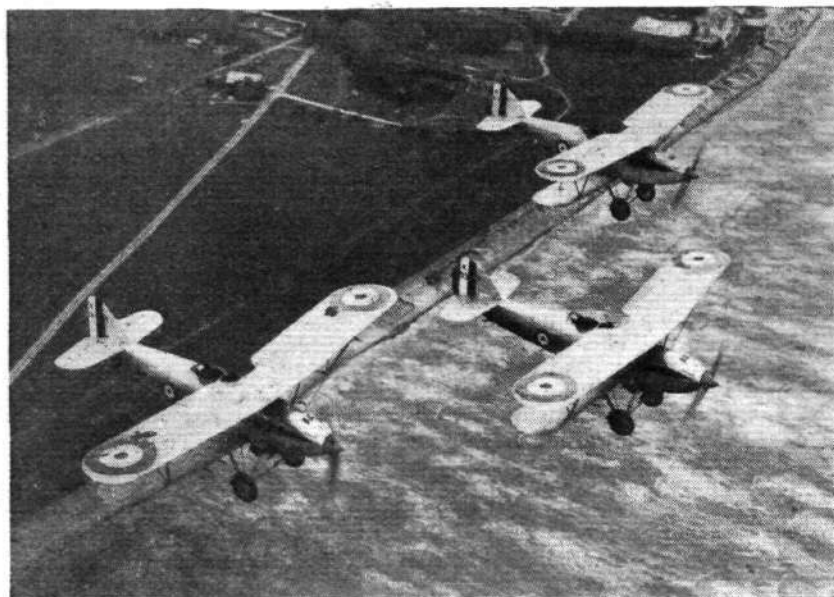
The Marquess of Londonderry, Secretary of State for Air, hoped he would be forgiven if he directed himself more particularly to the question of defence against air attack. It was not that the people of these islands and of the British Empire had ceased to regard the Royal Navy with the significance and support which it had held since the days of the Armada, but that there had grown up altogether new problems of defence. He was not prepared to deny that the geographical position of this country was in many ways particularly disadvantageous as regards vulnerability to air attack.

On the subject of the range and bomb-carrying capacity of our aircraft he said performance ran in an inverse direction in that the heaviest machines had the largest carrying capacity and the lowest performance as compared with the lighter types. The study of means of defence against gas bombing, thermit and fire bombing was not being neglected. A new branch had been set up at the Home Office to deal with passive defence and to continue and intensify the study which had been carried on for some years past under the Committee of Imperial Defence. Research had continued steadily throughout the last few years into such matters as sound locators, searchlights and predictors for aircraft gunnery. Lord Lloyd appeared to have forgotten that the Government had lately appointed a special sub-committee of the Committee of Imperial Defence to enquire into the question of defence against aerial bombing.

A 1923 Resolution

Lord Londonderry then recalled that in 1923 it was laid down by the Government of the day that our air power "in addition to meeting the essential requirements of the Navy, Army, Indian and Overseas commitments, must include a Home Defence Force of sufficient strength adequately to protect us against air attack by the strongest air force within striking distance of this country." At the same time it was announced that a Home Defence Force should be provided, consisting in the first instance of fifty-two squadrons. Successive postponements of the fulfilment of that scheme were partly financial but mainly political. They might have rested on over-optimistic expectations from what was going to be achieved at the Disarmament Conference. When Germany left the League of Nations in 1933, and in view of the continued growth of air armaments in many other countries, we were compelled to abandon our policy of unilateral disarmament. Last July, in the face of further deterioration in the international situation, a new programme was announced. We were, for example confronted with an admitted increase of German air estimates from 78 million marks to 210 million marks in 1934. Our programme of air defence, as announced simultaneously by himself and the Lord President, provided for the expansion of our home defence air forces from 52 to 75 squadrons, and for other additions to the R.A.F. which would bring its first line strength all over the world up to 128 squadrons. He would remind their Lordships that at that time they only secured assent to his proposals on the assurance that they would be prepared not only to increase but also to decrease our preparations should the international situation warrant it.

Lord Londonderry said he would also remind their Lordships that in February last, representatives of France visited this country and entered into consultations with a view to the re-examination of the situation. The result was the London Agreement, which contained an invitation to Germany to enter, with Italy and Belgium, into frank and free consultations with the French and ourselves. A Pact for Air



EMPIRE AIR DAY: (Left) A flight of "Harts," from Eastchurch, loaded with 8½ lb. practice bombs, make for the bombing target moored off Leysdown. (Right) A diamond formation by "Demons" of No. 23 Squadron, from Biggin Hill. The Day is described on pages 580-584. (*Flight* photographs.)

Security was an integral part of that agreement. In response to an invitation from Germany to send representatives to consult with Herr Hitler, this country was prepared to do so, but before the visit took place Germany announced that she possessed an air force. In spite of this we determined to allow arrangements to stand. The Secretary of State for Foreign Affairs (Sir John Simon) and the Lord Privy Seal (Mr. Eden) paid the promised visit last March. Sir John Simon was then informed that not only did Germany possess parity in the air with this country, but that Germany's aim was parity with the French air forces for her home defence. He would emphasise the fact that, apart from any question of breach of provisions of the Treaty of Versailles, the time chosen for these announcements was the very moment when we were making the proposals for the Air Security Pact.

Turning to the subject of Germany's air strength, Lord Londonderry said that he had always regretted the enormous figures which had been quoted, and which had been officially denied by the German Air Ministry. But that must not prevent them from realising that Germany's present air activities called for prompt and vigorous action. This did not betoken any unfriendliness to Germany. Far from it. He welcomed the statement which Herr Hitler made the previous day, in which reference was made to the limitation of armaments. While hoping that those words would be translated into deeds we were wholly unprepared to accept a position of inferiority. Statements made by the Lord President (Mr. Baldwin) and the Under Secretary of State for Air (Sir Philip Sassoon) last November concerning Germany's air strength had **not** been proved wrong. The acceleration of Germany's programme—which obviously we could not control—had falsified the figures relating to the future.

Germany's Air Strength

Another development of which they must take serious account in drawing up our future plans was that Germany had decided to push forward into her first line a larger proportion of her available air resources, for it was now claimed that Germany's first line strength was between 800 and 850 aircraft. He thought these figures could only be justified by Germany including in her first line aircraft a greater proportion than was compatible with what was necessary to provide and maintain an effective combatant force. One could organise one's forces in depth on a narrow front, or less deeply on a wide front.

The organisation of Germany's aircraft industry was a factor which had to be reckoned with most seriously. We were considering what steps were necessary to put our own industry on a still firmer footing.

On the all-important question of flying personnel Lord Londonderry said that at present there were on the active list of the R.A.F. 2,700 fully trained pilots. There were a further 400 under training, and, in addition, there were 1,200 fully trained service pilots in the Reserve, which was in course of being rapidly expanded. It took twelve months to give a military pilot really efficient preliminary training. It took another eighteen months' service in a squadron before he could

be called a fully competent military pilot. Until complete units had been exercised in collective training and squadron manoeuvres in combination with other units full military efficiency could not be attained. Specialised courses at various schools were necessary before the personnel of a military air force could be regarded as fully masters of their art. In the light of these factors we could still claim that we had an air force with a more solid backing behind it than any other air force in Europe.

Turning to the subject of supply of aircraft, Lord Londonderry said that some months ago they took steps necessary to secure a considerable reduction in the period from the issue of specifications to the production of a new machine. Risks would now be taken, with money only, which the financial state of the country in the early years precluded them undertaking. But for all that, it remained true that every machine was obsolescent from the moment of its adoption. The German air force, which was equipped with none but the most recent machines, had an advantage there, but was already losing that advantage, and we had newer types in an advanced stage which would be issued to the R.A.F. during the contemplated period of its expansion.

Explaining how it had come about that we were admittedly backward in regard to heavy and medium bombing machines, Lord Londonderry said that in February, 1932, the Disarmament Conference opened and proposals were put forward for limiting the maximum size of aircraft. The British Government tabled proposals to the effect that the maximum unladen weight of military aircraft should be about three tons. This figure was exceeded both by the present and by the proposed replacement types of this country. It was then decided to postpone the design and development of new heavy bombing types which, if the recommendations had been adopted, would have had to be scrapped. By last summer the prospect of disarmament had receded, and the Government decided to proceed with the design of new heavy and medium weight bombers. To make up for lost time, ordinary contractual and technical procedure must be over-ridden in respect of the heavy bomber, and a special order was placed under wholly abnormal procedure. This action was initiated last July. It had resulted in a contract for delivery, not later than February, 1936, of the first of a new type of heavy bomber with a guaranteed performance.

The Secretary of State for Air then outlined the proposals of the Government as follows:—

"By March 31, 1937, that is, at the end of the next financial year, the strength of the Royal Air Force based at home, irrespective of the Fleet Air Arm, will be 1,500 first line machines. This compares with an actual first line figure of 580 machines at the present day, excluding the Fleet Air Arm, and with a total of 840 which we should have reached by the same date under the programme of expansion announced last July and provided for in the current Air Estimates. In short, we are nearly trebling the present strength of the Royal Air Force at home to-day."

From this, Lord Londonderry said, there followed a tremen-

HANWORTH COUNTRY CLUB

OFFICIAL RE-OPENING

ON SUNDAY NEXT,
JUNE 2nd, 1935

ALL PRIVATE OWNERS AND CLUB
MEMBERS INVITED AFTER 2.30 p.m.

A Programme of Air events will be carried out
commencing at 3 p.m., as follows:

3 p.m. PRIZE SILVER CUP. A 20 mile handicap, race, 5 mile laps, for any aircraft bona fide the property of recognised flying clubs and/or private owners, to be flown by "A" licence pilots. No one will be permitted to compete in this event who has flown fewer than 50 hours solo. Log Books to be produced before the start. Entrance fee 10/6 to be sent with entry.

4 p.m. PRIZE SILVER CUP. A 25 mile handicap race open to all classes of aircraft with a declared speed of 140 m.p.h. or over to be flown by "B" licence Pilots and "A" licence Pilots who have flown more than 300 hours solo. Entrance fee £1 1.0.

A CONCOURS D'ELEGANCE. The system of awarding points will give every entry a chance. Regard will be had in awarding points to the type, age and purpose of the aircraft together with the number of hours flown.

PRIZES:

SILVER CUP for highest award cabin aircraft.
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The Central Band of the Royal Air Force will be in attendance, and tea will be served from 4.15 onwards. All arrivals by Air free landings.

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By FRANK A. SWOFFER, M.B.E.

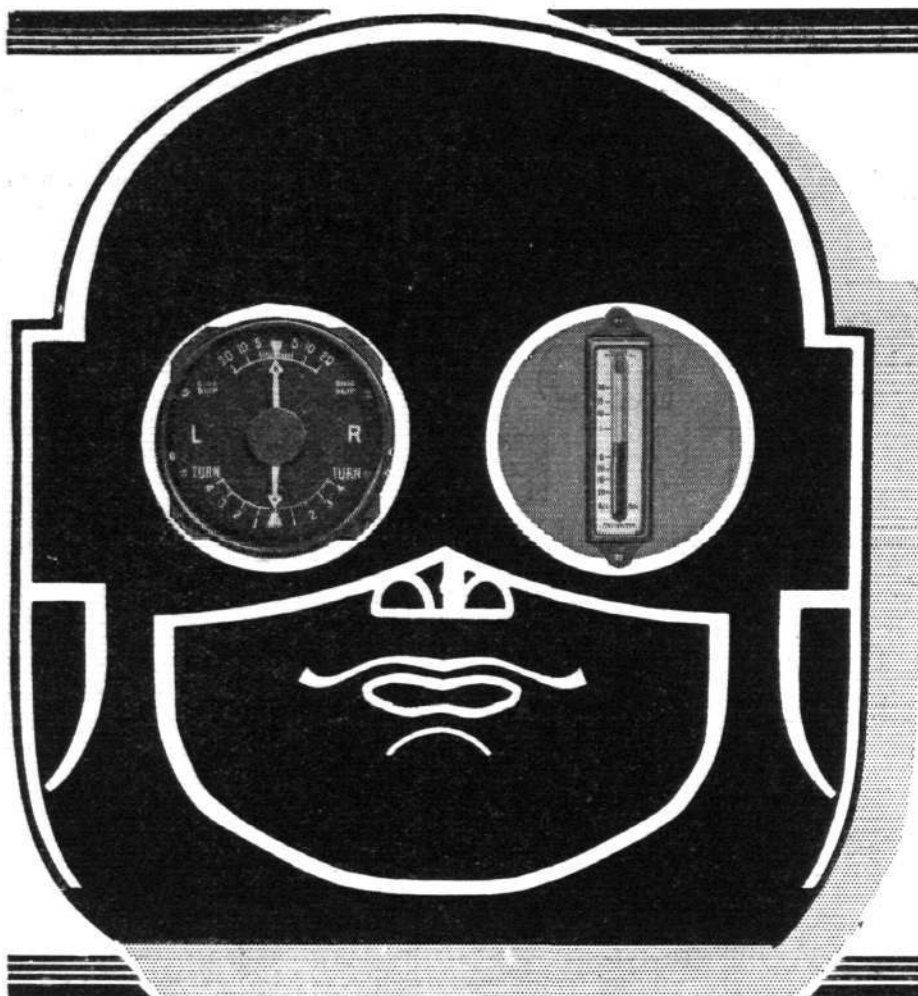
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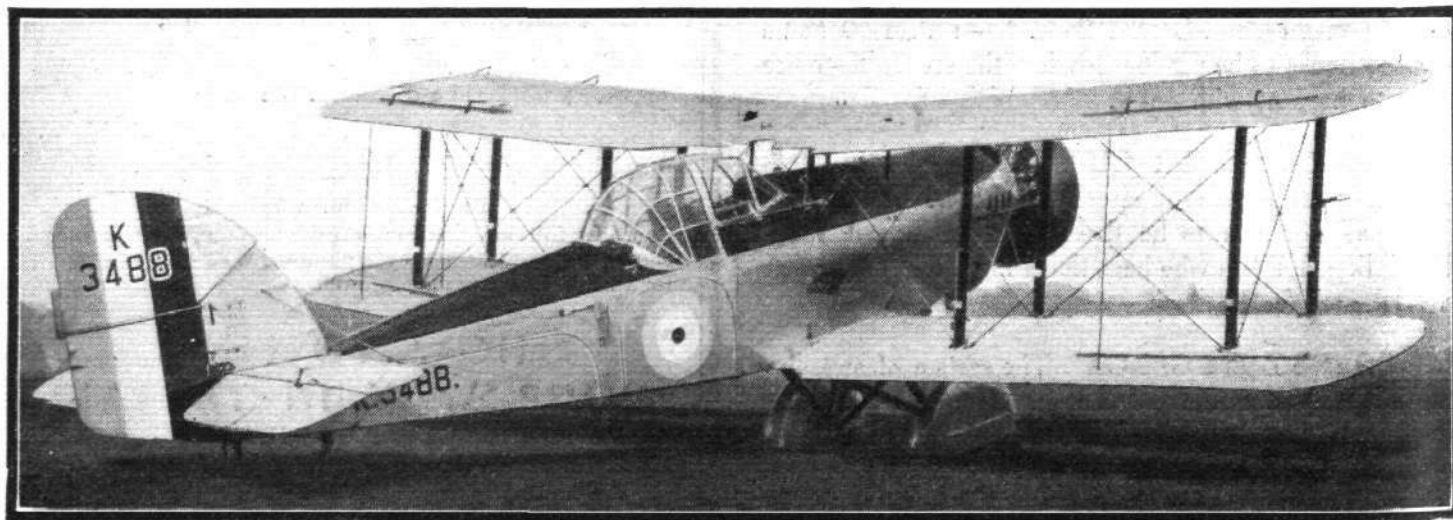
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dous expansion of our activities over the whole field. From the aircraft industry he had already received assurances of full co-operation. This problem would need very special attention, and he had placed himself in close touch with Lord Weir, who would, he trusted, find himself able to assist by acting in an advisory capacity in connection with supply, production and industry.

"As to personnel," Lord Londonderry continued, "we shall require 2,500 more pilots, and a total, including pilots, of nearly 22,500 additional personnel. This year alone we shall put into training between 1,200 and 1,300 new pilots, and in addition we shall retain the services of hundreds of officers and men who would be normally taking their discharge and returning to civil life this year."

For training purposes, Lord Londonderry remarked, they would substantially increase the present number of four civilian training schools for the initial flying instruction of pilots, and they would add five new R.A.F. training schools to the five already in existence.

Thirty-one New Stations

While the exact allocation of the new home defence first line strength of 1,500 machines in squadrons had been purposely left undetermined, the new programme meant that 71 new squadrons for home defence would be formed in the present and next financial years instead of the 22 under the present programme. In addition to the 18 new stations required under the present programme of expansion, they would require 31 new stations of one kind or another under the new programme. The cost would inevitably be substantial, but the Secretary of State for Air said he was not at present in a position to give any figures.

With reference to Germany's capacity for increasing output, although he had never accepted the figures given by Lord Rothermere, Lord Londonderry said that in a country under a dictatorship the whole body of the people were controlled and regimented, and the mobilisation of industry was a matter of comparative simplicity. The British people, on the other hand, were a free people and would neither tolerate dictators nor the semblance of autocracy. But we could and would discover our own answer to that particular problem. His Majesty's Government, Lord Londonderry stated emphatically, would not in any circumstances accept a position of inferiority in the air to Germany. If the programme which he had announced proved insufficient they would increase it, cost what it might in money or effort.

To the young men of the country, whatever their walk in life, he would say that the time had come for them to see to it that Great Britain was given the Air Force she needed. Let them enrol freely as soon as the requirements of the R.A.F. were made public.

The Commons Discussion

On May 22, also, the question of the R.A.F. expansion was discussed in the House of Commons. The Lord President of the Council (Mr. Stanley Baldwin) explained that when the date was originally set for the debate they had expected that Herr Hitler's speech would have been delivered in time for it to be given mature consideration. That had been postponed, owing to the death of Marshal Pilsudski, and Herr Hitler's speech was not delivered until the previous night. Nevertheless, the speech was very elaborate and would receive the fullest and fairest consideration from the Government.

As Mr. Baldwin's speech covered much the same ground as that covered by Lord Londonderry in the House of Lords, we do not propose to give it at any great length. One or two points from it are, however, of interest. With regard to the figures of German air strength which he gave last November, Mr. Baldwin said that he still considered those figures correct. Where he was wrong was in his estimate of the future. "There," Mr. Baldwin said, "I was completely wrong. I tell the House so frankly, because neither I nor any advisors from whom we could get accurate information had any idea of the exact rate at which production was being, could be, and actually was being speeded up in Germany in the six months between November and now." They could get no facts. The only facts that he could now put before the House were those which he had from Herr Hitler. Until he had reason to doubt those facts, and at present he had no such reason, he would accept them. It now appeared that Herr Hitler's goal was parity with France, and now Great Britain was basing her estimates on that strength.

In discussing the question of production Mr. Baldwin said the Government was determined that there should be no profiteering in a time which could almost be called a time of

emergency. There would be great demands for certain types of labour. There would be great demands for the production of factories, and he hoped that none of those interested parties would try to make capital out of the situation. Mr. Baldwin then explained the calling in of Lord Weir to help with the organisation of the industry.

Mr. Attlee pointed out that his party did not stand for unilateral disarmament. It stood for collective security through the League of Nations. The Government was asking for a large increase in armaments, and they had to express an opinion whether the proposed increases were justified and whether they would provide increased security. He noticed that there was nothing about civil aviation in Herr Hitler's speech. There was no use in limiting the expenditure on fighting aeroplanes when all over Europe enormous subsidies were being given for civil aviation. The peak had been reached in Italy, where 98.2 per cent. of the receipts were derived from subsidies. He held that there was no way out of the air menace but to grapple with it on international lines.

Sir Archibald Sinclair said he thought that to avert the danger of war it was above all necessary that every nation should be loyal to its obligations under the Covenant of the League of Nations. Unless Article 19 was recognised as enjoying equality of status with Articles 10 and 16 the League would forfeit its character as the organ of public right and become merely an alliance of the satisfied powers to preserve the *status quo* as long as they could against the dissatisfied powers. Germany had not been treated with the scrupulous fairness due to a proud and valiant nation. The people of Germany were entitled to receive justice and equality of status and treatment, and he was convinced that until that demand was satisfied Germany would remain a danger to peace. Herr Hitler had made it clear that his air force was measured by that of France. Ours was to be measured by that of Germany, and must therefore obviously be measured by that of France. Surely they could get into touch speedily with France and press forward with the idea of an air pact between France, Germany and ourselves. Did the Government include the German first line machines only, or did they include the dual-purpose machines, the civil machines which could be easily transformed, and were, in fact, fitted for speedy transformation into bombing machines? He also thought there ought to be national factories for dealing with the rapid expansion.

Two Years Too Long?

Earl Winterton wanted to bring the debate back to the subject of defence policy, and proceeded to give a recital of events during the last two years. He was alarmed that we were going to take two years to increase our first line to 1,500 machines. He was informed that the Germans could produce twenty military aeroplanes a day.

Mr. Pickthorn, in a maiden speech, said that he had been compelled to be acquainted with a high proportion of the young. The young could not be frightened out of war. They would keep out of war for other reasons. If we were going to be subjected to intensive air warfare what was going to matter was the risk of a civilian panic. The bombing of towns would only be good tactics if civilian panic was likely, and working up panics beforehand was likely to lead to the adoption of those tactics. New offensive weapons had always been unreasonably and excessively feared. No new offensive weapon had for long remained unanswered, and the defensive against air attack was certain to develop. There was loose talk of an air raid destroying London. Did anybody suppose that an air raid would damage London more than an earthquake did San Francisco? That was not the end of Californian civilisation, and the bombing of London would need to be repeated and almost continual. The raiding force would lose a considerable proportion, and if that loss were put no higher than ten per cent. prolonged aerial operations against London would involve a drain which no general staff could face happily. Replacement of pilots would take longer than replacement of aeroplanes, and to have the greatest number of pilots was, therefore, a valuable precaution. If there never were a war again an ample British share in air transport would be a necessity, and it was a British interest for all the Dominions to be joined together by air. It was, therefore, high time that they began to be urgent, if not anxious, about our mercantile aviation. Canada was half-way between Europe and the Far East, she was the greatest reservoir of man power, and the Canadian people were unmatched in the virtues which flying demands. The development of east and west main flying routes across Canada was an urgent necessity.

Captain Balfour said it was very unfair that this country

should be accused of taking part in, or starting, an armaments race. Italy could build her battleships, Germany could introduce conscription, France could call up reservists, and Russia could maintain the greatest standing army in Europe. None of that was an arms race, but as soon as this country took the tardy step of putting its defences on a reasonable basis they were accused by their own citizens of starting an arms race. Herr Hitler had denied that Germany had 10,000 aeroplanes. It was rather academic to discuss 100 aeroplanes this way or that, and was of small importance in comparison with the fact that in 18 months or two years from now the disparity gap would need panic measures. He would like to give some items of first-hand knowledge. When an American aircraft firm some time ago received an enquiry from Germany for certain supplies they thought a mistake had occurred. The requisition referred to asked for 27,000 of a particular casting, sufficient to supply 3,000 engines of one particular make.

Turning to ourselves, Capt. Balfour said that our first requirement was a greatly increased number of aerodromes in places which were "not strategically disadvantageous." There was difficulty in obtaining land, but a plan could be worked out for taking over instantly, and under compulsory powers, aerodromes throughout the country. We should also have a number of factories, and those factories should not be within the London area. He hoped the Government would insist that production should take place in areas far away from the points most likely to be bombed, and also in areas where there was much unemployment. There should also be a drastic overhaul of the system of supplies of aircraft. To-day the largest single order for aircraft was for a 1927 design. That was not a good enough state of affairs on which to base future expansion. The system of trying to achieve perfection had resulted in an official check on enterprise, and official procedure had so clogged the wheels of initiative and inventiveness that to-day our aircraft supplies were not what they should be.

Mr. Churchill's Views

Mr. Churchill said he welcomed the language Herr Hitler used against the indiscriminate bombing of civilian populations. At the same time he had to remind them that the German air force contained a larger percentage of long-distance bombing machines than the air force of any other nation. He did not believe that the increased air force which they were contemplating should be entrusted entirely to the existing aircraft industry. In his opinion national factories for producing particular types of aeroplane should play a part in the strengthening of the air force. He made the suggestion that they might have a discussion in a secret session, as it would be a great advantage if they could discuss some of the technical points without being overheard by all Europe.

Dr. Addison had a creepy feeling when he thought how they were going to get the increased number of aeroplanes. Here

was a State Department with no designing department, and having to rely on the designing departments of fifteen different firms. He recalled what happened during the War, and concluded that they must bring the supply system into one department, with adequate powers to control costs from start to finish.

Admiral Sir Roger Keyes put in an argument for a separate air service for the Navy. All fighting to obtain command of the sea was the business of the Navy, whether carried out by surface craft or aircraft, and dual control could only lead to confusion and inefficiency. He complained that all the Admiralty's efforts for years had been thwarted by the Air Ministry. The sooner the Government relieved the Admiralty of the handicap of the present system the better. The Air Ministry would have plenty to do to put its own house in order. Recently an officer who had spent his whole life in the R.A.F. had said to him: "If you were really running your own show you would have wings on your torpedo boats by now." He said the majority of members would be astonished to learn that the Navy was not allowed to have flying boats. Every navy had flying boats which were infinitely superior to those possessed by the R.A.F.

American Example

Mr. Taylor, in the second maiden speech of the debate, submitted that in view of the post-War actions of European nations we owed allegiance or military assistance to no one. But in view of our unsatisfactory defence forces we could not avoid entanglements which might otherwise be unnecessary. He pointed out that the United States of America had no intention of being drawn into a war, but nevertheless her forces were adequate for the protection of her people. He thought Great Britain should express her willingness to co-operate with the other great English-speaking nation in a mutual desire for peace. He suggested that as the War Loan and Victory Bonds were offered to the public for subscription in time of national need, so a National Defence Loan might now be offered.

Col. Wedgwood complimented Mr. Taylor on a perfect maiden speech. He agreed with Mr. Taylor that a situation like the present was not to be met merely by an increase in the Air Force vote. He strongly urged a loan for the building up of factories to provide aeroplanes until production was got up to 20 or 30 aeroplanes a day. He thought the machines to be produced should be fighting aeroplanes, not bombing aeroplanes, and based his view on the contention that the bombing aeroplane could never work if the other side had control of the air, and this control would be decided by the fighting aeroplanes.

Wing Commander James said he was certain Herr Hitler would make the abolition of air warfare one of the main planks of his platform. At the present juncture nothing would suit Germany better. If air warfare were to be abolished it would leave the German army again the paramount force in Europe.



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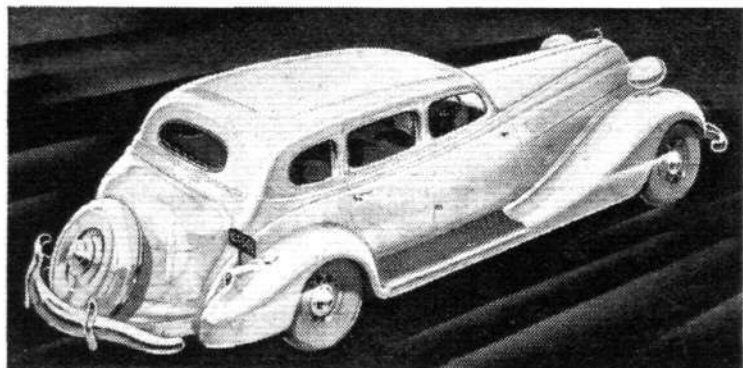
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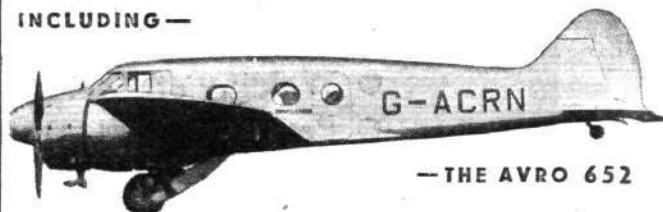
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While agreeing that Herr Hitler's speech contained some suggestions which it would be a pity to regard with prejudice, he was bound to say that if one looked back on German history, internal or external, during the last 60 years, it was difficult to believe that there had been a complete change of heart in a great people who had never hesitated to resort to force the moment it suited their purpose to do so.

Capt. Guest expressed the opinion that Germany had to-day at least 100,000 men actively engaged in the production of aircraft. He thought a strong civil aviation would give us what we wanted when the danger came, and would do so without giving offence to any other country. Other countries had devoted large subsidies to civil aviation, and their industries were in a far better position than ours to turn their attention to military requirements. America had thought it wise to devote £25,000,000 to civil aviation, spread over four or five years, and Germany devoted £24,000,000 to so-called civil aviation last year. France had found it possible to devote £4,000,000 to civil aviation. These were the reasons why we had got left so far behind.

Mr. Wilmot asked whether they were really expected to believe that 700 aeroplanes would make the difference between peril and security. He thought most members would agree that there was no security in what had been proposed. He believed it absurd for anyone to imagine that the British nation had any thought of aggression, but Germans did not think so, and Frenchmen did not think so. Foreigners, unfortunately, did not take us at our own valuation, and with their suspicious minds they saw in our armaments a menace to their security just as we saw in their armaments a menace to our security. He suggested that every nation threatened by the German menace should meet in concert and establish a pooled defence force, pooled in reality as the Allied armies were pooled during the War, with a common command and common operation.

Mr. Maxton expressed the hope that the House would not for one minute listen to the suggestion of a secret session of Parliament to discuss air armaments. There were, he said, any number of opportunities for groups of members to meet in secret and any number of ways by which groups of members might convey their secret conclusions to the secret meetings of the Cabinet.

Sir Philip Sassoon's Statements

Sir Philip Sassoon said the experience of the last two years had led us to the realisation that it was a delusion to suppose that unilateral disarmament led to agreed limitation. We had gone into unilateral disarmament and no one had followed our example. Even in connection with the collective system of security our weakness would prevent us from putting in our just quota.

Elaborating the outline which Mr. Baldwin gave of the new programme, Sir Philip said the immediate objective was the creation of a first line force of 1,500 machines by March 31, 1937. These were first-line aircraft with reserves behind them, and their full organisation organised in squadrons. The figures did not include Overseas units or that portion of the Fleet Air Arm which might happen to be situated in Home waters. He drew attention to the fact that although our Overseas commitments were in many ways a liability, in other ways there was compensation in the fact that they were more a source of strength than of weakness. For example, our training, technical and other establishments were all situated in this country. Thus we had technical and training resources at our disposal on a far greater scale than we should have if they only had to serve units stationed in this country. They were retaining the services of some hundreds of officers and men who would otherwise be taking their discharge. This

would involve, in so far as permanent officers were concerned, retirement at higher age limits and the extension of service of short-service and medium-service officers. The re-engagement of airmen would ensure the availability of an adequate number of personnel of appropriate experience able to fill the higher non-commissioned ranks in the expanded force.

Turning to technical equipment, Sir Philip said that the demands upon the industry would be very heavy, but they had every reason to believe that the manufacturers would rise to the occasion. On the subject of the possibility of setting up Government factories, Sir Philip said that unless and until it was found that the present industry could not meet the requirements there seemed to be little point in doing so.

Concerning the training of personnel, Sir Philip announced that it had been decided to proceed with the scheme whereby the civilian industry was used for the training of pilots. For many years they had been using civilian training schools for training reserve pilots recruited direct from civilian life. It was decided some time ago to increase the number of these civilian schools to ten, and to use them for the training of short-service officers as well as for reserve officers. They were now going to increase the existing number to between 12 and 15 civil training schools.

The Improved Supply System

Sir Philip said that, referring to the question of the long time which elapsed between the issue of specifications and the passing of machines into service, the Air Ministry entirely agreed that the system which had prevailed in the past was not in accordance with the needs of to-day. Last November they asked the leading representatives of the aircraft industry to come to the Air Ministry for a discussion of the whole question, and the situation was made plain to them. The S.B.A.C. were asked to let the Air Ministry have a statement of their views on the best method of tackling the problem. Valuable suggestions were made, and as a result a new system [Outlined at the beginning of this report.—ED.] had been evolved and provisionally accepted. The aim of the revised procedure was to shorten by rather more than half the present period for getting new types into production. The new system would have its drawbacks, particularly as they might be unlucky when ordering in quantities machines not wholly satisfactory owing to the curtailment of Service trials. Apart from exceptional cases none of the essential stages were to be omitted. Another important feature of the scheme was to place on individual constructors a far greater responsibility than they had previously had, and to give them with that responsibility much greater freedom of official control. The actual specifications would be very much shortened and simplified, and generally the industry would be given very great liberty of action.

On the subject of the German air force, Sir Philip said that the claim made recently that all their military equipment was new required some explanation. They had reason to believe that there were at least two types of aircraft in service in Germany to-day that were designed in 1929 and 1930. Nor was it likely that in a few years of rapid technical development the equipment of the German Air Force had been able to escape those teething troubles with which we were so painfully familiar.

He did not think the situation in connection with civil pilots was too unsatisfactory in this country. During the past ten years 6,000 pilots had taken out "A" licences, and of these 5,000 had taken out "A" licences in the last five years. There were more than 3,000 "A" licences in the country to-day, and they were taking steps to see what could be done to reduce the number of those pilots who allowed their licences to lapse. As for the light aeroplane clubs, the number was more than double as compared with twelve months ago, and they expected to get from the clubs a membership of 5,000.

HERR HITLER'S SPEECH

IN his speech to the German Reichstag on May 21 Herr Hitler defined German foreign policy in thirteen points. Those relating to air matters may be summarised as follows:—

Germany is ready to discuss an air agreement and to agree to limitations at parity with other great powers. She regards a return to the ideas of the former Geneva Red Cross Convention as the only possible means to practical limitation of unbounded armaments. She believes it possible to proscribe the use of certain arms as contrary to international law and to ostracise those who use them. For example, there might be prohibition of the dropping of bombs outside the real battle

zone. Germany believes that this limitation can be extended into complete international outlawry of all bombing, but so long as bombing as such is permitted, she considers that any limitation of bombing aeroplanes is questionable in view of the possibility of rapid substitution. If bombing is branded as illegal barbarity, the construction of bombing aeroplanes will soon be abandoned. It was once possible gradually to prevent the killing of defenceless wounded through the Geneva Red Cross Convention. It must be equally possible to forbid and finally stop the bombing of defenceless civil populations by an analogous convention. Germany sees in such a treatment of this problem a greater assurance and security for the nations than in all pacts of assistance and military conventions.

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AIR MINISTRY ANNOUNCEMENTS

EXPANSION—PERSONNEL MEASURES

The Air Ministry announces that consequent on the decision rapidly to expand the Royal Air Force, it is necessary to take the most vigorous steps to provide the large body of skilled pilots and tradesmen required. These steps will include: (1) the entry for training of large numbers of personnel; (2) the re-entry of personnel who have passed to the reserve or left the service; (3) the retention in the service of personnel due to go out in the next two years. The steps to be taken under (1) and (2) above are explained below.

Entry

The total entries that will be required in the present and the next succeeding year are approximately:—Pilots, 2,500, tradesmen and unskilled men, 20,000. Of these approximately half will be required before April, 1936. These entries are far in excess of any the Air Force has had to provide for in the past, and the whole-hearted co-operation of the country will be required.

Pilots.—A large proportion of the pilots required will be entered as officers on short-service commissions. Young men of good personality and education (not lower than School Certificate standard) and of over 17½ but under 25 years of age are invited to apply in writing to the Air Ministry (SE7), Adastral House, Kingsway, London, W.C.2. Accepted candidates will be appointed for four years' service on the active list followed by six years' service in the reserve. An opportunity may later be given to them to extend the active list period of their service. They will receive pay and allowances in cash or kind equivalent to £325 on entry and increasing to £380 after a year's service, and will be entitled on passing to the reserve at the end of their active list service to gratuity at the rate of £100 for each year of such service after the first year.

Increased numbers of Airman Pilots will also be required. The method of application, age limits and periods of service will be the same as those given above for short-service officer candidates. Accepted candidates will be given the status of Airman Pilot on completing their initial flying training. They will receive pay and allowances in cash or kind equivalent to £200 per annum at the outset and increasing to £270 per annum on qualifying as pilots and will be entitled on passing to the reserve at the end of their active list service to gratuity at the rate of £25 for each year of such service after the first year.

Entrants for Fitter and Rigger Duties.—An entry of about 1,300 men a quarter (in addition to the normal entry of Aircraft Apprentices) is required for duties in connection with the maintenance of aircraft. As many as possible of these should be men with a basic training in fitting in civil life. Men so qualified and under 42 years of age are invited to apply in writing or in person to the R.A.F. Recruiting Depot, Victory House, Kingsway, London, W.C.2. If accepted after trade test they will be enlisted for six years' service on the active list and will be entitled, in addition to free accommodation, clothing and rations, to pay at the rate of 3s. 6d., 4s. 3d., or 5s. 6d. a day, according to the degree of qualification they show on passing out of their initial period of about one year's training. While under training they will receive pay at the rate of 3s. 6d. a day in addition to accommodation, etc., as above.

In addition to these men, who are skilled fitters in civil life, men of superior intelligence will be considered, on application to the R.A.F. Recruiting Depot, for acceptance for training as Mates, Flight Mechanics or Flight Riggers, preference for selection being given to those with mechanical experience. The Mate assists the skilled tradesman; the Flight Mechanic or Rigger will undertake the maintenance work on aircraft in the flights under the supervision of the fully skilled man. Those accepted, who must be over 18 and under 32 years of age, will be enlisted for six years' service on the active list and will pass to a short course of elementary training as Mates. The best of these will go on to a longer course to qualify either as Flight Mechanic or Flight Rigger. Those who pass out as Mates will receive initial pay of 2s. 3d. a day; those who pass out of training as Flight Mechanic or Flight Rigger will receive pay of 3s. 3d., 4s., or 5s. a day according to the degree of qualification they show in their passing out test. While under training they will receive pay at the rate of 2s. a day. These sums are again in addition to free accommodation, clothing and rations.

Secondary School Entrants as Armourer, Wireless Operator, or Photographer.—An entry of about 400 a quarter (in addition to the normal Boy Entry) is required for training in these three trades. Young men of superior intelligence with a secondary school education or with some experience in the trades in question are invited to apply to the R.A.F. Recruiting Depot. They must be over 17 years and under 32 years of age. Those accepted will be enlisted for six years' service on the active list and will be given a course of training as Armourer or Wireless Operator or Photographer. On qualifying as such they will receive pay, in addition to free accommodation, etc., at the rates of 3s. 3d., 4s., or 5s. a day according to the degree of skill they show in the passing out test at the end of their training. While under training they will receive pay at the rate of 2s. a day.

Other Types of Entrant.—In addition to the classes described above, a large number of unskilled men over 18 years and under 26 years of age will be accepted for entry as Aircraft Hands. Such entrants will be given the opportunity of being selected for training in one of a number of trades after about a year in the Service. Particulars regarding this entry and regarding a number of trades not dealt with above for which smaller numbers of men skilled in civil life are required can be obtained from the R.A.F. Recruiting Depot.

Recruiting of Ex-Airmen

In order to secure an adequate body of experienced tradesmen in the service, tradesmen (other than men in Group V) who have passed to the reserve or been discharged, are invited to apply to the R.A.F. Recruiting Depot to re-enter the Air Force for four years' service on the active list. Normally, re-enlistment will be limited to men under the age of 42, but exceptions will be made in respect of men specially required. Such men will be re-enlisted on a new four-year engagement and given the rank which they held in the reserve or on discharge and will receive pay, etc., accordingly at the rates now current. Men who were on the married establishment on transfer to the reserve or on discharge will be restored to the married establishment immediately on re-enlistment. Service under this engagement will not give enlistment to service pension or to any increase in the rate of pension already in issue; on discharge on the completion of four years' service re-enlisted airmen (other than re-enlisted pensioners) will, however, receive gratuities as follows:—Group I trades, £150; Group II trades, £100; other trades, £75. Re-enlisted pensioners will not be entitled to these special gratuities but they will, during their service, be specially allowed to continue to draw their pensions in addition to full pay.

CHANGE IN HIGHER COMMAND

The Air Ministry announces the following appointment:—Group Capt. Paul Copeland Maltby, D.S.O., A.F.C., to command Royal Air Force, Mediterranean, with effect from a date early in June, 1935, vice Air Comdre Charles Edward Henry Rathborne, C.B., D.S.O.

Group Capt. P. C. Maltby entered the Army in 1911 as 2nd Lieutenant (Temporary Captain) and was seconded to the Royal Flying Corps in 1915. During the Great War he served in France and, in addition to receiving the awards of D.S.O. and A.F.C. was mentioned in despatches.

He was appointed to a permanent commission in the Royal Air Force as Squadron Leader in 1919 and later commanded a unit in India. In 1925 he was promoted to Wing Commander, and among his later appointments he has been Director of Training at the Air Ministry and in command of the Central Flying School. Group Capt. Maltby was promoted to his present rank in 1932.

SPECIALIST PERMANENT OFFICERS

A recent addition to King's Regulations and Air Council Instructions lays it down that officers of the General Duties branch holding permanent commissions who have taken an appropriate University honours degree before entering the R.A.F., when qualifying as specialists, will normally undergo shortened engineering and signals courses.

ROYAL AIR FORCE GAZETTE

London Gazette, May 22, 1935

General Duties Branch

Capt. M. C. Lassetter (R.A.R.O.) is granted a short service commission as a Flight Lieutenant on the Supplementary List with effect from May 1, and with seniority of Sept. 14, 1928.

The following Acting Pilot Officers on probation are confirmed in rank and graded as Pilot Officers:—J. B. Black, J. B. Broll, H. L. Dawson, A. H. Donaldson, J. Duncan, W. H. Kearne, L. M. Laws, K. N. Lees, B. G. Morris, A. D. Murray, R. J. C. Nedwill, J. S. O'Brien, G. V. M. O'Reilly, J. Pilling, F. H. Roberts, L. W. Saben, J. E. Thornton (March 16); C. N. Fleming, D. P. Frost, M. Hallam, G. A. Kitching, A. A. McMath, E. K. Piercy, S. G. Pritchard, J. D. T. Revell, G. A. Richmond, R. E. Sharp (April 3).

The following Acting Pilot Officers are graded as Pilot Officers on probation:—R. A. Charles-Auckland (Feb. 27); G. T. Gilbert (March 4); G. F. Chater (March 8).

The following Acting Pilot Officers on probation are graded as Pilot Officers on probation:—W. E. Legard (Jan. 24); D. E. Cattell, D. J. North-Bomford, G. I. Pawson, L. H. Pomeroy, E. A. Verdon-Roe (March 16); M. H. de L. Everest, J. W. Hathorn, D. C. Torrens (April 3).

F/O. P. F. Canning is promoted to the rank of Flight Lieutenant (April 21).

The following Pilot Officers are promoted to the rank of Flying Officer:—R. A. E. Traill (March 29); C. H. T. Warner, D. W. H. Gardner (April 2); I. H. D. Walker (April 9); F. H. Dixon, G. R. Howie (April 23).

Flt. Lt. F. L. P. Henzell is placed on the half-pay list, Scale B, from Dec. 17, 1934, to April 19 inclusive. (Substituted for the notification in the *Gazette* of Jan. 1); Cdr. M. S. Slattery, R.N., Squadron Leader, R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (May 7); Lt.-Cdr. J. H. F. Burroughs, R.N., Flight Lieutenant, R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (April 16); Wing Cdr. S. R. Watkins, A.F.C., is placed on the retired list (May 17).

Stores Branch

The following Flying Officers are promoted to the rank of Flight Lieutenant (April 28):—G. Matthews, M. J. Scott, J. S. French, E. J. H. Starling, H. E. Freeston, J. E. Reynolds.

Medical Branch

F/O. H. Bannerman, M.B., B.S., is promoted to the rank of Flight Lieutenant with effect from Jan. 8 and with seniority of May 1, 1934; F/O. H. S. Barber, M.B., B.Ch., is promoted to the rank of Flight Lieutenant with effect from Jan. 8 and with seniority of July 18, 1934.

The following Flying Officers are promoted to the rank of Flight Lieutenant:—D. R. Crabb, M.R.C.S., L.R.C.P. (Jan. 8); V. D'A. Blackburn, M.B., Ch.B. (Feb. 21).

Wing Cdr. T. S. Rippon, O.B.E., M.R.C.S., L.R.C.P., is placed on the retired list (May 19).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

F. R. Matthews is granted a commission as Flying Officer in class AA (April 26).

The following Pilot Officers on probation are confirmed in rank:—E. A. Starling (March 7); J. E. I. Crump (April 16).

The following Flying Officers are transferred from class A to class C:—H. E. Mayes (Aug. 9, 1934); W. Lowry (May 6); J. G. Butt-Reed (May 8); W. R. C. Wilkins (May 22).

F/O. B. T. Aikman is transferred from class AA (ii) to class C (July 29, 1934); the notification in the *Gazette* of April 30 concerning Flt. Lt. J. H. Barringer is cancelled.

Medical Branch

Flt. Lt. R. J. I. Bell, M.R.C.S., L.R.C.P., relinquishes his commission on completion of service (April 14).

SPECIAL RESERVE

General Duties Branch

F/O. G. R. H. Black is attached to the Royal Air Force from May 7 to Nov. 5 inclusive.

AUXILIARY AIR FORCE

General Duties Branch

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—A. V. R. Johnstone is granted a commission as Pilot Officer (May 3).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders.—P. Huskinson, M.C., to Air Armament School, Eastchurch; for Armament duties vice Wing Cdr. E. H. Sperling, A.F.C. A. T. Whitelock, to R.A.F. Station, Andover, 17.5.35; to command vice Wing Cdr. S. R. Watkins, A.F.C.

Squadron Leaders.—H. J. Roach, A.F.C., to School of Naval Co-operation, Lee-on-the-Solent, 1.5.35; for flying duties vice Sqn. Ldr. H. J. Collins. H. N. Hampton, D.F.C., to No. 821 (F.S.R.) Squadron, 8.5.35; to command vice Sqn. Ldr. F. C. B. Savile. R. L. McK. Barbour, D.F.C., A.F.C., to D.D.W.O. Dept. of A.M.S.O., Air Ministry.

Flight Lieutenants.—C. W. Dicken, to No. 202 (F.B.) Squadron, Cadzana, 29.4.35. K. A. K. MacEwen, to No. 29 (F) Squadron, North Weald, 12.5.35. J. H. Edwardes Jones, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 13.5.35. B. W. Knox, to Air Armament School, Eastchurch. C. McK. Grierson, to No. 230 (F.B.) Squadron, Pembroke Dock. C. R. Smythe, to School of Naval Co-operation, Lee-on-Solent.

Flying Officers.—W. R. Brotherhood, to No. 27 (B) Squadron, Kohat, India, 30.3.35. H. P. Burwood, to No. 35 (B) Squadron, Bircham Newton, 17.5.35. E. B. C. Davies, to No. 60 (B) Squadron, Kohat, India, 17.4.35. T. F. U. Lang, to No. 31 (Army Co-operation) Squadron, Quetta, India, 23.3.35. S. P. Langston, to No. 28 (Army Co-operation) Squadron, Ambala, India, 20.3.35. C. E. S. Lockett, to No. 5 (Army Co-operation) Squadron, Quetta, India, 24.3.35. A. H. Marsack, to No. 47 (B) Squadron, Khartoum, Egypt, 27.4.35. C. C. Morton, to No. 28 (Army Co-operation) Squadron, Ambala, India, 20.3.35. T. U. Rolfe, to No. 20 (Army Co-operation) Squadron, Peshawar, India, 30.3.35. W. L. Stewart, to No. 31 (Army Co-operation) Squadron, Quetta, India, 23.3.35. N. C. Hendrickz, to No. 2 F.T.S., Digby. C. S. Byram, to No. 45 (B) Squadron, Helwan, Egypt, 26.4.35. R. B. Lees, to No. 4 Flying Training School, Abu Sueir, Egypt, 10.5.35. M. A. Payn, to Air Armament School, Eastchurch, 22.4.35. C. Charlton-Jones, to No. 821 (F.S.R.) Squadron; E. F. E. Barnard, to No. 29 (F) Squadron, North Weald; D. O. Finlay, to No. 17 (F) Squadron, Whyteleafe; W. W. Loxton, to No. 1 (F) Squadron, Tangmere; N. F. Simpson, to No. 56 (F) Squadron, North Weald; K. G. Stodart, to No. 17 (F) Squadron, Whyteleafe; W. E. Carr, to No. 56 (F) Squadron, North Weald.

Acting Pilot Officers.—G. L. Cruickshanks, to No. 14 (B) Squadron, Amman, Transjordan, 23.4.35. The following Acting Pilot Officers are Posted to No. 2 Flying Training School, Digby, on 7.5.35, for flying training:—M. R. Baillon, J. L. M. Bell, P. H. Bragg, R.

Cave-Browne-Cave, G. A. L. Cheatle, J. J. E. Coats, R. B. Cox, P. J. G. Davies, G. W. P. Derbyshire, G. H. J. Feeny, G. H. N. Gibson, J. Greenhalgh, D. A. Hamilton, R. B. Harvey, A. C. Heath, J. V. Hoggarth, C. J. K. Hutchins, E. L. Hyde, A. G. T. James, C. H. Jones, J. A. C. Karran, L. J. Kiggell, R. H. S. King, L. A. G. S. Lewer, R. C. Love, F. R. McAllister, A. S. McTurk, C. A. Masterman, C. G. Masters, W. E. Mullford, C. L. Page, M. V. Peters-Smith, A. C. Rabagliati, J. Rankin, B. D. Sellick, J. G. Spencer, R. D. Stubbs, A. J. Young. The following Acting Pilot Officers are posted to No. 6 Flying Training School, Netheravon, on 7.5.35, for flying training:—R. C. Ayling, M. Beckett, H. R. A. Beresford, L. O. Brooks, W. H. Carroil, M. G. W. Clifford, G. L. A. Cooper, A. G. F. Cunningham, C. F. Darbishire, D. V. W. Francis, D. E. Gillam, J. C. Halley, P. M. Hamilton-Hall, P. G. Heath, G. R. Humphries, E. P. W. Hutton, H. H. A. Ironside, H. B. Johnson, H. D. Jones, P. G. Keeble, R. N. Keeble, F. J. Kelly, G. A. H. Kent, T. M. Lockver, F. A. Marlow, K. M. McCrudden, R. A. Milward, P. C. R. O'Hara, R. J. Ommanney, R. H. Paterson, P. C. Pinkham, P. H. Richmond, E. G. Rogers, J. B. W. Smith, P. A. M. Stickney, G. W. C. Watson, J. L. Wells, E. L. Wurtele.

Stores Branch

Flight Lieutenant.—J. W. Hustwaite, M.B.E., to No. 4 (Army Co-operation) Squadron, S. Farnborough, 7.5.35.

Medical Branch

Group Captains.—W. Tyrrell, D.S.O., M.C., to Headquarters, R.A.F. Inland Area, 9.5.35, for duty as Principal Medical Officer. A. Grant, M.B.E., to Headquarters, R.A.F. India; for duty as Principal Medical Officer vice Wing Cdr. R. W. Ryan.

Wing Commanders.—R. S. Overton, to Headquarters, R.A.F., Iraq, 17.4.35; for duty as Deputy Principal Medical Officer, vice Wing Cdr. P. T. Rutherford, O.B.E. W. G. L. Wambeck, to Station Headquarters, Heliopolis, Egypt, for duty as Medical Officer. T. Montgomery, to Headquarters, Western Area, Andover, for duty as Principal Medical Officer vice Wing Cdr. A. J. Brown, D.S.O. P. T. Rutherford, O.B.E., to No. 6 Flying Training School, Netheravon, for duty as Medical Officer.

Flight Lieutenant.—C. H. Smith, to R.A.F. General Hospital, Palestine and Transjordan, 6.4.35. J. Magner, to Marine Aircraft Experimental Establishment, Felixstowe.

Flying Officers.—The following were posted to Medical Training Depot, Halton, on appointment to Short Service Commissions:—P. A. Cooper, L. E. A. Dearberg, R. C. H. Tripp, H. L. Willcox, A. R. C. Young; J. C. Blair, to Station Headquarters, Amman.

A FAMILY AFFAIR

The Story of the All-Caudron Coupe Deutsch Race

IN spite of the fact that this year's Deutsch Cup Race was such a "family" affair—there were only five machines competing, and all were of the same make—the contest aroused great enthusiasm in France, especially as several records were lowered during the course of the race, in spite of wind and rain squalls.

The contest (writes our Paris correspondent) was flown over a circuit beginning and ending at the Etampes (Mondésir) Aerodrome, situated about 40 miles south of Paris. The course was a triangular one of 100 km. (62½ miles), with turns at Etampes, Chartres and Boncé. The northern apex of the triangle was marked by a pylon in the middle of the Etampes field, which arrangement kept the competitors in almost constant sight of the spectators.

The race consisted of two sections of 1,000 km. (625 miles) each, with an hour's interval between them. The rules governing the contest were simple: cylinder capacity was limited to 8 litres (488.2 cu. in.), and all that was required by way of qualification was a preliminary flight of 500 km. (310.7 miles) at a minimum speed of 300 km./hr. (186.4 m.p.h.), and a take-off and landing within a distance of 500 metres.

Records Fall

As briefly reported in last week's issue of *Flight*, Raymond Delmotte, chief pilot of the Caudron Company, was the winner. His Type 460 single-seater, low-wing Caudron was equipped with split flaps and a retractable undercarriage. The engine was a 330 h.p. Renault six-in-line air-cooled engine, supercharged, and fitted with a Ratier variable-pitch airscrew. Delmotte covered the two sections of the contest at an average speed of 443.96 km./hr. (275.8 m.p.h.). His best time was made over the first section, comprising 1,000 km. (625 miles), which he covered at 446 km./hr. (277.1 m.p.h.), thus establishing a new record for that distance. The previous figure was 409 km./hr. (254 m.p.h.) put up by Helen Boucher last year at Istres.

Yves Lacombe, also flying a Caudron 460, similarly equipped, finished second at 424 km./hr. (263 m.p.h.). Maurice Arnoux, winner of last year's Deutsch Cup, finished third, being credited with an average of 348 km./hr. (217½ m.p.h.). Actually he piloted two machines during the race. He took off in one of the three Caudron 460's (a machine with the same equipment as those of Delmotte and Lacombe). Arnoux

flew the seventh lap at a speed of 469 km./hr. (291 m.p.h.), thus establishing a new record for 100 km. over a closed circuit, the previous figure being 431.65 km./hr. (269 m.p.h.) set up by Delmotte last year. In making this phenomenal burst of speed, however, Arnoux exhausted the oil supply of his engine and was obliged to land at Cuscé, a small town along the course.

In the second half of the race, therefore, Arnoux piloted the Caudron 450, which had been flown during the first half by Monville. The 450 is a counterpart of the 460, with the exception that the undercarriage is a fixed one. Arnoux, incidentally, won the race last year with this machine at a speed of 389 km./hr. (241 m.p.h.).

M. Louis Hirschauer, Inspector of Commercial Aviation, acted as starter. All five Caudrons took off easily after a run of about 150 to 200 yards, lowering their flaps about ten degrees to aid them in doing so. Incidentally, the pilots also made the fullest use of their flaps when landing.

After three laps at an average speed of about 285 km./hr. Franco, piloting the "Rafale" tourist machine, dropped out, being, as was expected, outclassed. Monville on the Caudron 450 was badly handicapped by an eleven-minute delay through a fouled plug at the start, and, the elapsed time being debited against him, was credited with only 200 km./hr. on the first round. He completed the first section of the race at an average speed of 375 km./hr. (233 m.p.h.).

As previously mentioned, Arnoux established a new record in the seventh round, but was obliged to land in the eighth, and took over Monville's C.450 for the second section.

Delmotte flew a splendid race, maintaining a constant speed at about the same altitude throughout, and making close turns around the pylons on nearly the same line each time. Lacombe followed close behind him, but Arnoux was again obliged to land, immediately after his take-off in the second section, by reason of slight engine trouble. This was quickly adjusted and he took off again at once.

British items of equipment figured in the results; K.L.G. plugs were used in the winning machine and, as reported last week, the winner and runner-up used Palmer tyres.

As it has now been won three times by machines representing the Aero Club of France, the Deutsch Cup becomes the club's property. It was announced at the close of the meeting that Mlle. Deutsch de la Meurthe had presented a new cup to be competed for next year.

AT THE B.I.F.

Aero engine lubricants figure in the Wakefield Company's exhibit at the Birmingham Section of the British Industries Fair.

NO WESTLAND-G.A.L. MERGER

It is now announced that the merger with which, as recorded in *Flight*, rumour was busy last week, between the Westland Aircraft Works and General Aircraft, Ltd., is not likely to materialise.

AIRCRAFT DISTRIBUTORS, LTD., MOVE

As from June 1, Aircraft Distributors, Ltd., will cease to operate at Heston, and will move over to Hanworth. Later the London office staff at 53a, Shaftesbury Avenue will be transferred to Hanworth.

The company, incidentally, announces that Mr. John Rogers, late of the Klemm Company, is taking over the post of Chief Sales Manager in succession to Mr. M. A. Lacayo.

FOR INTER-CONTINENTAL RECORDS

For some little time it has been known that Mr. T. Campbell Black was planning a series of long-distance flights with a modified D.H. "Comet," the construction of which is well advanced. This will actually be the fifth of the series and, with the help of high octane fuel, is expected to cruise at 10,000ft at 220 m.p.h., and to have a maximum speed of about 240 m.p.h. The range in still air will be in the region of 3,000 miles. The compression ratio of the "Gipsy-Six" engines has been raised from 5.25 to 6.5 to 1 and controllable-pitch airscrews will, of course, be used.

NEW NAPIER DIRECTOR

D. Napier and Son, Ltd., announce that Major F. B. Halford, F.R.Ae.S., has been elected a director of the company.

FORMATION OF PARNALL AIRCRAFT, LTD.

Unusual interest is attached to the formation, just announced, of Parnall Aircraft, Ltd., for it marks a pooling of three notable interests. They are the firms of George Parnall and Co., the Hendy Aircraft Co. and Nash and Thompson, Ltd. In 1916 Parnall and Sons, Ltd., shopfitters, of Bristol, began the manufacture of aircraft for the Government; after the war Mr. G. G. Parnall formed the firm of George Parnall and Co., which has since built a larger number of aircraft than is generally realised; several Parnall light aeroplane types of ten years or so ago will be well remembered, but what is not so well known is that the company has built a number of special experimental machines for the Air Ministry, and has also carried out experimental work for several well-known aircraft manufacturers.

The development of the Hendy Company, which was responsible for the "Hobo" and "Heck," is sufficiently recent to be well known. Nash and Thompson, Ltd., of whom Capt. Frazer Nash, the racing motorist, is a director, have for several years specialised in aircraft armament, and, it is stated, contracts have been entered into for fitting their equipment to new and existing R.A.F. types.

Directors of the new company are Lt.-Gen. Sir Louis Ridley Vaughan, K.C.B., K.B.E., D.S.O., Lt.-Col. L. V. S. Blacker, O.B.E., Capt. A. Frazer Nash, M.I.A.E., A.M.I.Mech.E., and Mr. E. G. Thompson. The share lists were opened last Tuesday.

FLIGHT

MISCELLANEOUS ADVERTISEMENTS

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C CIRRUS II Moth for Sale. 50 hours since complete engine overhaul, and very small airframe hours since last complete. Recently spent nearly £70. Wings re-bagged, etc. C. of A. to next May. £245 or very near offer. A genuine bargain. Pollard, Smallacre, Bush Hill, N.21. Enfield 0655.

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C COMPLETE Seaplane Chassis for Fox Moth, entirely overhauled by makers and in first class condition. Offers wanted. Apply Grierson, c/o Short Bros., Rochester.

C COURSE and Distance Calculators, with time and distance scales. 7in. Mk. II. New. Ex R.A.F. 10s. 6d. each, post free. Special rate for quantities. L. Lipton, 614, Old Ford Road, London, E.3. Advance 3345.

C COMPER SWIFT. For immediate sale. Pobjoy engine. C. of A. August. Total hours 150. Just repainted. Sutton Harness, extra tankage. Airlog. Huson III compass. £200, or near offer considered. Box No. 8769, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.

D DE HAVILLAND Fox Moth, Gipsy Major, 12 months C. of A., completely fitted night flying, turn and bank indicator, air-log hours, 274. £635. Box 1101, c/o "Flight," Dorset House, Stamford Street, London, S.E.1.

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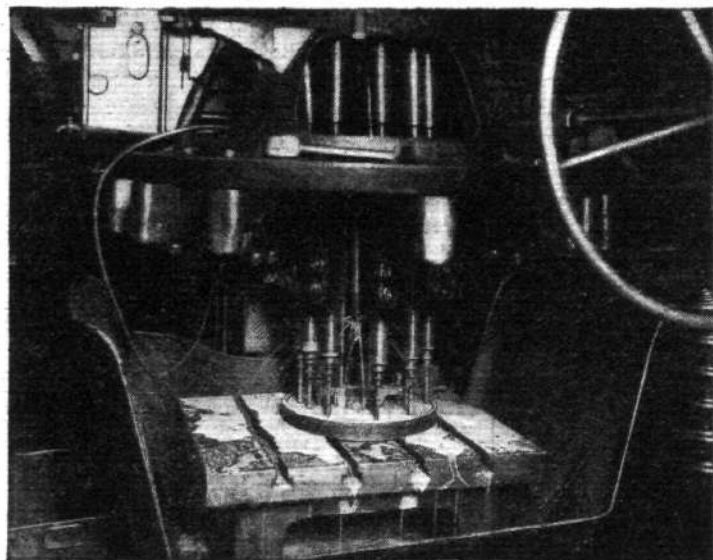


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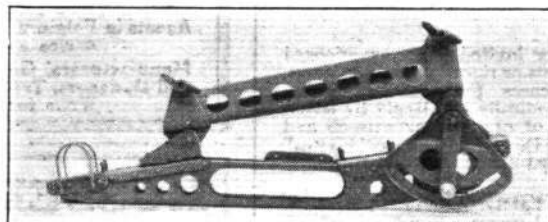
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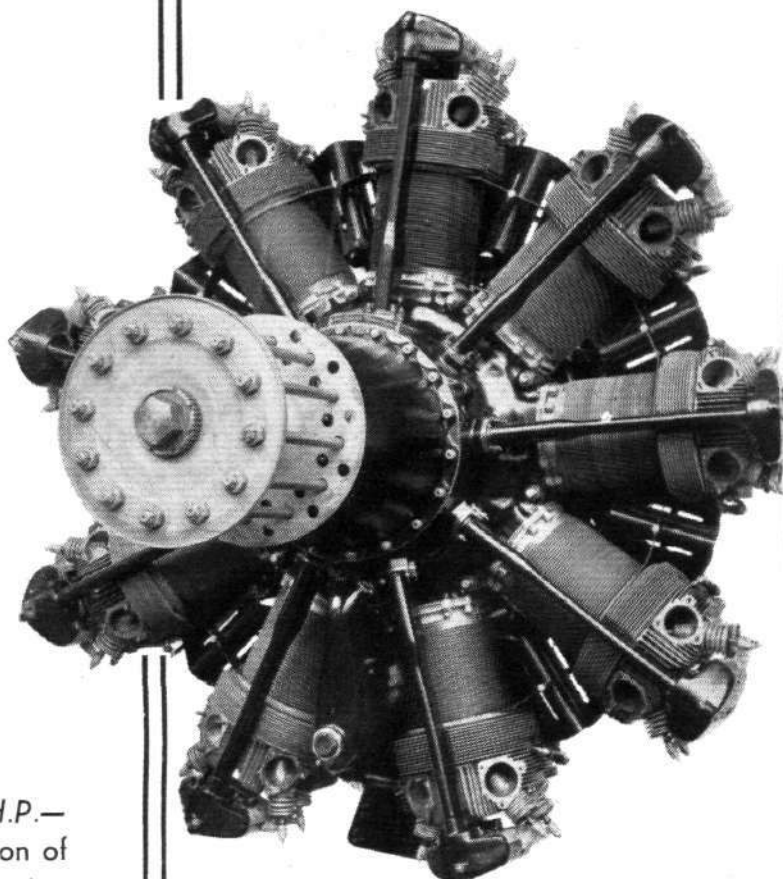
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